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1941

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CANADIAN GEOGRAPHICAL JOURNAL

Editor - *Gordon M. Dallyn*

49 METCALFE STREET, OTTAWA

This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustrations, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth, and other parts of the world in which Canada has special interest.

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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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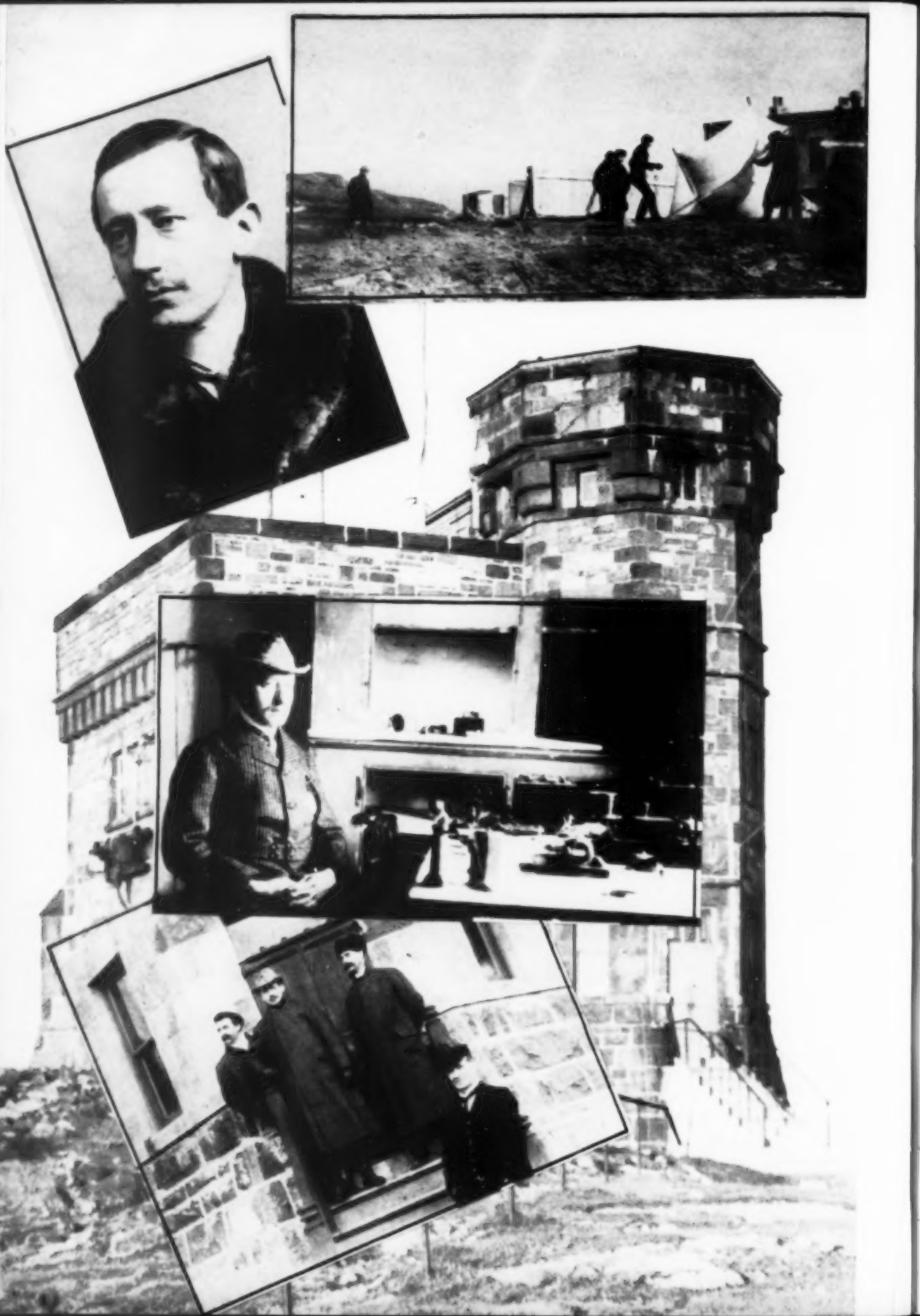


Development of Radio Communication in Canada

by ARTHUR L. NEAL

AMONG the passengers aboard the little steamer *Bruce* when she docked at North Sydney, Nova Scotia, after a mid-December crossing of the gulf from Port-aux-Basques, Newfoundland, in the year 1901, were three dejected men. They were Guglielmo Marconi and two assistants, who, only a few days previously, had aroused the interest of the whole world by successfully transmitting the first wireless telegraph signal across the Atlantic—a distance of about 2,000 miles from Poldhu, in Cornwall, to St. John's, Newfoundland.

The possibility of setting up a regular system of transatlantic wireless communication seemed assured, but early hopes were dashed almost immediately by opposition from the companies interested in the submarine cable. So long as Marconi's wireless was in the experimental stage and regarded as nothing more than a scientific curiosity no resistance was encountered, but when it was announced that signals had actually been transmitted, the cable companies began to fear for their competitive position. Under an agreement with the Newfoundland Government they claimed the exclusive right to telegraphic communication with that colony and obtained from the courts an injunction restraining Marconi from further work on the island. This was a serious blow since tentative experiments at Cape Cod had not proved wholly successful and had given rise to the belief that a site on the mainland of the American continent would not be feasible.

Arrival on the forbidding coast of Cape Breton in the early hours of the morning did not help to raise the spirits of Marconi and his associates. All they had in prospect was a tiresome wait of nearly two hours for the train which was to carry them to New York. Awaiting them on the dock, however, was young Alex. Johnston, owner, editor and chief reporter of the *Sydney Record*, and local Member of Parliament. He was there to greet them in his capacity of reporter, but he had a more important and far-reaching purpose in mind besides getting a good story. Johnston had sensed at once the tremendous possibilities of the new system of communication, and, so soon as the news of Marconi's difficulties in Newfoundland was made known, he had satisfied himself that there was no great geographical difference between Cape Breton and Newfoundland as the western terminus of the transatlantic wireless communication system. Of this he determined to convince Marconi, and obtain for his constituency the distinction, and, if any, the profit of being the site of further operations on the American continent.

Marconi, with typical Latin courtesy, was affable about giving the story. Certainly, publicity would be no hindrance when he arrived in New York to seek the financial assistance he was hoping to get there for further experimental work. The second objective was more difficult. Time was short, and Marconi, after the opposition he had met in Newfoundland, was hard to persuade that Cape Breton, also British territory, would be less hostile. Johnston reassured him on this. He had also armed himself with charts and maps and pointed out that there was no intervening land between Cape Breton and the European station at Poldhu. This was important because at that time Marconi felt that land would obstruct the signals. He began to show some interest but was still unconvinced, and, by this time, his train was about ready to leave. It was a crucial moment for Johnston. If Marconi left on that train further experimentation would be long postponed — perhaps forever on British soil — on this side of the Atlantic. Summoning all his persuasiveness, Johnston prevailed upon him to stay over and at least look over the surrounding territory.

Johnston's next step was to enlist the aid of Mr. Cornelius Shields, General

SIGNAL HILL, ST. JOHN'S, NEWFOUNDLAND, 1901

Top left:—Guglielmo Marconi

Top right:—Engineers preparing to fly the kite used by Marconi to support a long copper wire used as an aerial to pick up the radio signals from Poldhu, England.

Centre:—Signor Marconi seated before the coherer and other equipment used to receive the three dots of the letter "S" which was the radio signal received at Signal Hill from Poldhu, England. This was the first radio message to be received this side of the Atlantic.

Bottom:—On the steps of the Signal Hill station, G. Marconi with his engineers, G. S. Kemp (left) and P. W. Paget (right)

Montreal "Star"
October 21st, 1926.

First Press Messages by Beam Wireless Between London and Montreal

NUMBER	CHECK	TIME FILED
1.	137 *Via Marconi*	11. a.m.

SEND THE FOLLOWING MESSAGE SUBJECT TO THE CONDITIONS PRINTED ON THE BACK HEREOF

Lord Burnham
Imperial Press Conference
London.

On the occasion of the transmission of the first wireless press message by the Beam system between Canada and Great Britain permit me to congratulate you on the completion of this new link of Empire. With full knowledge of the efforts you have made to increase the efficiency of inter-Dominion communication within the Empire I feel that the first message sent by the Montreal Star should be one of felicitation to you for the new step forward which the invention of Senatore Marconi aided by able engineers on both sides of the Atlantic has made possible. I believe we are at the beginning of a new era in Empire communication with possibilities not hitherto foreseen which will work a revolution in the distribution of Empire news.

Atholstan

NUMBER	CHECK	TIME FILED
	Via Marconi	

SEND THE FOLLOWING MESSAGE SUBJECT TO THE CONDITIONS PRINTED ON THE BACK HEREOF

LORD BURNHAM TO LORD ATHOLSTAN MONTREAL

GREATLY APPRECIATE YOUR FELICITATIONS TO ME AS PRESIDENT OF THE IMPERIAL PRESS UNION OF EPOCH MAKING SUCCESS WHICH HAS CROWNED THE LONG DRAWN EFFORT OF MARCONI AND ALL WHO HAVE COOPERATED WITH HIM IT IS THE OPENING OF A NEW ERA IN THE RAPID TRANSMISSION OF NEWS AND THE INSTANTANEOUS COMMUNICATION OF IDEAS ITS DIRECT INFLUENCE UPON JOURNALISM AND POLITICS WILL BE INCALCULABLE IT IS A NEW GERDLE PUT ROUND THE WORLD FOR CLOSER UNDERSTANDING BETWEEN ALL MEN OF GOODWILL I AM DELIGHTED THAT THE FIRST BEAM MESSAGES SHOULD PASS BETWEEN LONDON AND MONTREAL FILED LONDON 4-58 PM GMT-

Oct 21 12 55 PM

If this is a Trans-Atlantic Message, State whether it is to be sent at Full or Deferred Rate, or Otherwise

At the top is a reproduction of the first message sent over the Marconi Beam Wireless system between Montreal and London. It is from Lord Atholstan to Lord Burnham, President of the Imperial Press Union, and was transmitted at the rate of nearly two hundred words a minute.

Below is the reply from Lord Burnham to the message of greeting from the President of the Montreal Star Company. Lord Burnham fyled it one hour after receiving his message and it was recorded in Montreal three seconds later decoded and delivered to the Montreal Star representative within a minute.

Manager of the Dominion Coal Company. The company operated a short railway which ran along the coast, and Shields, entering into the spirit of the enterprise, arranged a special train to take Marconi and his assistants, himself, Johnston, A.S. Kendall (a Parliamentary colleague of Johnston's) and Hon. G. H. Murray, Premier of Nova Scotia, who happened to be in Sydney at the time, over the line.

When the little train chugged up to Table Head, near Glace Bay, Marconi and the other two experts, who had been watching the countryside closely, with one accord remarked on the apparent suitability of the spot. Mr. Shield reached for the bell-cord and stopped the train. The party got out and inspected the whole area carefully. The three wireless experts satisfied themselves that this was the site for which they were looking. It was owned by the coal company. Mr. Shields rose nobly to the occasion. "Mr. Marconi," he said, "if this property will serve the purpose, my company will be happy to place it at your disposal."

The dejection with which Marconi had arrived in Cape Breton now turned to elation, but there was still one more obstacle. The construction of a suitable station was estimated to cost about $75,000 or $80,000, and Marconi and his associates did not have this amount. In fact, it was for money that they were going to New York. But would New York be interested in advancing financial assistance for a station in Canada? The only hope seemed to be the Federal Government at Ottawa.

Once again the enterprising Johnston came to the rescue. If the Federal Government was to be approached he was the man for the job. Accompanied by Marconi and his Parliamentary colleague, Mr. Kendall, he came to Ottawa. There, in the stately East Block of the Parliament Buildings, the delegation obtained an interview with Johnston's personal and political friend, Hon. W. S. Fielding, Minister of Finance. Fielding was not the man to yield easily to requests for money from the public treasury. Besides, he had doubts, or, at any rate, professed to have them.

"Would the wireless work in Cape Breton as in Newfoundland?"

Marconi assured him he was certain of it.

"Even so, was it practicable for transatlantic communication?"

"Of that there is no question", Marconi countered.

Fielding showed signs of being impressed. The hopes of the delegation rose.

Insert shows bronze plaque, part of the memorial commemorating the work done by Marconi at Signal Hill in 1901.

THIS MEMORIAL IS DEDICATED
BY
CANADIAN MARCONI COMPANY
TO THE GOVERNMENT AND PEOPLE OF
NEWFOUNDLAND TO COMMEMORATE AN
OUTSTANDING EVENT IN THE HISTORY
OF NEWFOUNDLAND AND A NEW ERA
IN WORLD COMMUNICATIONS
THE FIRST TRANSATLANTIC WIRELESS
SIGNAL WAS RECEIVED BY
GUGLIELMO MARCONI
ON DECEMBER 12, 1901 ON THIS SPOT

Signal Hill, St. John's, Newfoundland, 1901

HEARD MONTREAL WIRELESS 'PHONE

Ottawa Demonstration of Wireless Telephone Proves Success

ATTEND LUNCHEON

Gov.-General, Sir Robert Borden, and Others Compliment Society

OTTAWA, May 21.—A large audience at the Chateau Laurier Assembly Hall, last night heard quite distinctly a gramophone played in Montreal, and also Miss Lotton singing in that city, over 100 miles away, by means of wireless telephony. The demonstration was arranged by Dr. A. H. Eve, in connection with an address on "Some great war inventions," before the Royal Society of Canada. The experiment took place at 9:30, and by means of a Magna Vox, the voice of the distant singer was quite distinctly heard in all parts of the hall. The Magna Vox, however, not only accentuated the sounds coming from the telephone receiver, but also the ordinary noises of a city, and for that reason at times the singing was slightly interrupted. Dr. Eve explained that scientists were endeavoring to so develop the instrument that only the sounds coming from the wire would be increased. Another test was made from a gramophone half a mile away, and that was very distinct. Several members of the audience were receivers similar to those used by "centrals" at the regular telephone exchange.

and they heard the singing from Montreal with absolute accuracy.

DISTINGUISHED GUESTS.

His Excellency, the Duke of Devonshire, Sir Robert Borden, Hon. W. L. Mackenzie King, Sir Henry Drayton, and Vilhjamur Stefansson were among the guests of the Royal Society of Canada at its luncheon yesterday. The Governor-General complimented the Royal Society on the work it had been able to do during the war and otherwise in the development of the community, and remarked that in the world conditions of today perhaps there was a danger men might be so devoted to the material needs of existence as to neglect research work and investigation.

His Excellency made a felicitous reference to wireless telephony, which was demonstrated last night. He tried to imagine the finance Minister's position, for instance, could his budget speech in the House of Commons have been actually heard throughout Canada, and ch enquiries that might have been addressed to him as to the possibility of obtaining suits whole or in part to avoid additional taxation.

Sir Robert Borden said that lately he had been somewhat out of touch with public affairs, and like a certain darkie had not been passing the time easily, but letting the time pass him. In a country like Canada, separated not only by distances, but in other ways, as people are, there was need for mutual understanding, and he believed the society was contributing a worthy part in the great project of building up a mighty and progressive nation. The war had brought many demands in applied sciences. Men had died worthily on the field of battle, but men of this society had played a not less noble part in their own line.

Humorously commenting on the lot that had been his during the last few days, the hvite deputations he had received, showers of letters and communications, Sir Henry said they were questions seemingly far removed from those which occupied the society.

Sir Henry remarked that the society had an awful lot of work still to do. He pointed to the enormous amount of iron ore to pig iron, that were being obtained from the States, besides an adverse trade balance. Canada herself had enormous supplies of ore, but which had, unfortunately a little

Montreal *Star* records a historic event in radio development, May 21, 1922.

But $75,000 was a lot of money, especially in those days, even for the Dominion Government.

Fielding turned to Johnston. "Surely, Alex.", he smiled, "you are not really in earnest about this."

The question was itself a concession, and, when the Minister finally told the delegation to have a talk with "the old man", they felt certain they had won a supporter.

The "old man", otherwise Sir Wilfrid Laurier, Prime Minister of Canada, received them cordially and with characteristic courtliness. But he was diplomatically non-committal, so the delegation, nothing if not persistent, sought out Mr. Mulock (now Sir William), Postmaster General, and succeeded in enlisting his support.

The rest of this story is well known. The three statesmen, Laurier, Fielding and Mulock had the vision to appreciate the potentialities of transatlantic wireless and the courage to act.

An agreement was entered into between the Dominion Government and Marconi's company by which the latter was subsidized to the extent of $80,000. Work on construction of the station at Table Head was placed immediately in hand. The station was completed and the first transatlantic message from the American continent to Europe was transmitted on March 30, 1903, to the *London Times*. In October, 1907, the station was brought into commercial operation and a limited service inaugurated with a corresponding station operated by the English Marconi Company at Clifden, Ireland. Full commercial service went into effect on February 3, 1908.

For the sake of historical completeness, it should be noted that the first radio communication in Canada preceded somewhat the transatlantic attempt. It was established in Canada between Chateau Bay, Quebec, the terminus of the Government north-shore telegraph line, on the north side of Belle Isle Straits, and Belle Isle, Newfoundland. The stations were erected by the Marconi Wireless Telegraph Company of London, England, for the Telegraph Division of the Department of Public Works, and were placed in commission on October 22nd, 1901. The purpose of the stations was to replace the existing cable between the island and the mainland which was continually being interrupted by ice. The two stations carried on a successful communication until they were replaced by the establishment of a regular chain of coast stations along the East Coast and Gulf of St. Lawrence by the Department of Marine, in 1904, 1905 and 1906.

PHENOMENAL GROWTH AND INTERNATIONAL CONTROL

The successful Canadian venture in transatlantic communication was followed by a period of intense activity in wireless everywhere. Financial backing, no longer timid, became abundant. The need for international regulation soon became apparent. A conference was called at Berlin in 1903, which prepared schemes for discussion at a second international conference meeting at Berlin in 1906. This conference discussed many details that had become of importance to the usefulness of wireless, including rules for handling and charging for telegrams, especially by

ships' operators, and regulations for the prevention of interference and for the enforcement of penalties. At the succeeding conference in London in 1912 a radiotelegraphic convention was drawn up and was signed by nearly all the principal countries. This provided for the establishment of a central office for collecting and distributing information about the wireless services of the world, and arranged for it to take its place as a branch of the Bureau of the International Telegraph Union at Berne. This office had by 1912 about 1,000 stations on its list. Even before the advent of broadcasting this number had grown to nearly 20,000, owing mainly to the increasing number of installations aboard ships.

Incidentally, the word "radio" was coined at the London Conference. The convention provided that the word should precede all messages transmitted over a wireless circuit to distinguish them from ordinary telegraph messages.

REGULATION AND LICENSING IN CANADA

Canada became one of the adherents to the London Radiotelegraphic Convention of 1912, and in the following year the Dominion Parliament passed the Radiotelegraph Act. The matter of Dominion jurisdiction was, however, subsequently questioned from time to time by certain of the provinces, but on February 9, 1932, the Judicial Committee of the Privy Council ruled that the control and regulation of radio communication is within the jurisdiction of the Dominion Parliament.

The 1913 Act remained in force until 1938 when, owing to the developments in radio during the intervening years, it was repealed and replaced by the Radio Act, 1938.

In the interim, however, the Canada Shipping Act had already been revised and those sections of the former Radiotelegraph Act pertaining to radio equipment in ships had been deleted and embodied in the revised Canada Shipping Act, 1934.

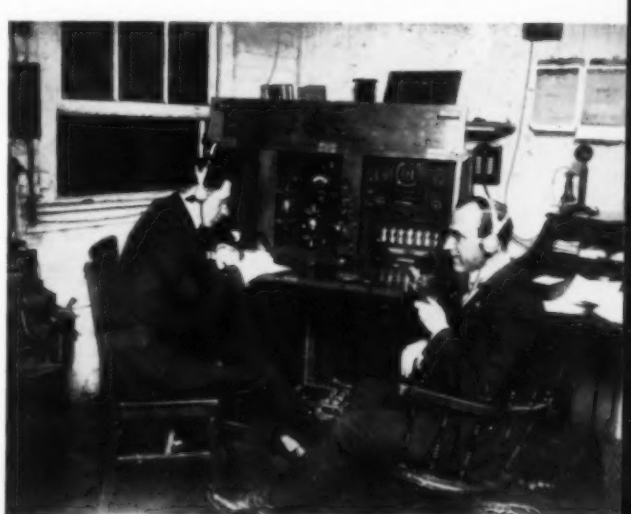
In 1932, the Canadian Radio Broadcasting Act was passed and under its terms control of all radio broadcasting was vested in the Canadian Radio Broadcasting Commission. This Act was subsequently repealed and replaced by the Canadian Broadcasting Act, 1936. Under the new Act, the technical control of all broadcasting stations reverted to the Department of Transport, while the regulation of programmes was placed in the hands of the Canadian Broadcasting Corporation; the Minister of Transport is also empowered to make regulations for the control of any equipment liable to cause interference with radio reception.

All radio stations are required to be licensed, whether used for transmission or reception, or both. The issuance of licences and the assignment of call signs and frequencies, as well as the inspection and monitoring of radio stations and the administration of certain other technical phases of the three acts, is done by the Radio Division of the Department of Transport. The table on page 187, a by-product of this official interest, gives the number of radio stations in operation in Canada according to various classes, as of March 21, 1936 to 1940.

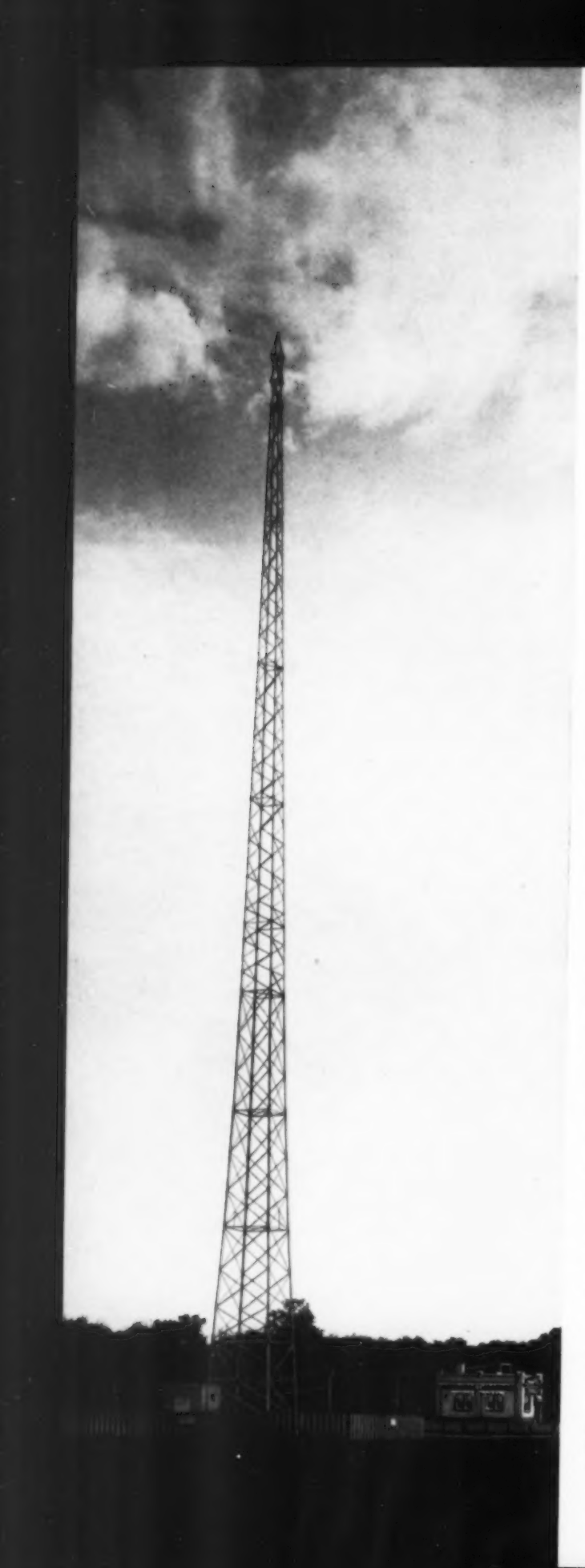
RADIO AIDS TO MARINE NAVIGATION

Radio communication facilities of several different types are essential for the safe and accurate navigation of ships and aircraft. In order to meet the requirements of Canadian as well as foreign ships plying Canadian waters, and aircraft flying over Canadian territory, the Department of Transport has established networks of direction finding, marine radio beacon, aviation radio range, radiotelegraph, and radiotelephone stations.

Four distinct networks of stations provide a complete radio aids-to-navigation service for ships. These networks serve the West Coast, the Great Lakes,



J. V. Argyle and J. O. G. Cann conduct first broadcast in Dominion of Canada at Marconi factory, Montreal, 1919, "XWA".



Gulf of St. Lawrence and Atlantic Coast, Hudson Bay, Strait and sub-Arctic. The complete system comprises eighty-one stations.

There are thirteen marine radio-direction finding stations in operation — seven on the East Coast, five on the Hudson Bay and Strait, and one on the Pacific Coast. During the fiscal year 1939-40 no less than 42,189 bearings were given, free of charge, to ships fitted with radio.

Radio beacons are established for the purpose of enabling any ship or aircraft equipped with a direction finder to determine its bearing or direction in relation to the radio-beacon station. There are thirty-one radio beacons in operation — eighteen on the East Coast, seven on the Great Lakes, and six on the Pacific Coast.

In clear weather each station, at advertised hours, transmits its characteristic for three periods of one minute, separated by silent intervals of two minutes. In foggy weather all stations operate continuously, maintaining a uniform time cycle of three minutes, each station transmitting in its proper sequence for one minute, separated by silent intervals of two minutes.

In addition to the above radio-beacon facilities, ships equipped with direction-finding apparatus may, upon request, obtain signals for the purpose of taking bearings from any of the coast stations. During the fiscal year 1939-40, 956 such requests for signals were handled. There is no charge for these services.

Twelve stations on the East Coast, seven on the Great Lakes, and five on the West Coast, broadcast by wireless telegraph information to navigators covering weather forecasts, position and nature of dangers to navigation, etc., twice daily at advertised hours. In addition, urgent information, such as hurricane warnings, etc., is broadcast immediately upon receipt. Two stations in the Hudson Bay and Strait also broadcast weather forecasts. The East Coast service has been suspended since the outbreak of war to prevent the enemy from gaining information.

In April, 1928, a radiotelephone broadcasting service to fishermen was inaugurated on the East Coast, which has

CKY transmitter tower and station, Headingly, Man., seventeen miles west of Winnipeg. Situated exactly on the First Meridian upon which western surveys have been based.

UTILIZATION OF RADIO IN QUEBEC FOREST AREAS

Top right:—Portable transmitter-receiver installed in canoe. Top left:—Portable equipment being operated on trail by forest ranger. Top centre:—Windmill for charging batteries at lookout tower. Bottom left:—Radio-equipped canoe with aerial poles in position. Centre:—Radio masts on the sky-line — Bellevue Tower — 300 feet above sea-level. Bottom right:—Taboret Station. Bottom centre:—Party on Lake St. Anne receiving information via radio from Bellevue Tower — thirty-six miles distant.

proved most successful. The majority of fishing vessels are now equipped with radio receivers to take advantage of this service.

Four stations are used for this purpose: Louisburg (VAS), Sambro Lightship (VGX), Saint John, N.B. (CHSJ), Yarmouth, N.S. (CJLS).

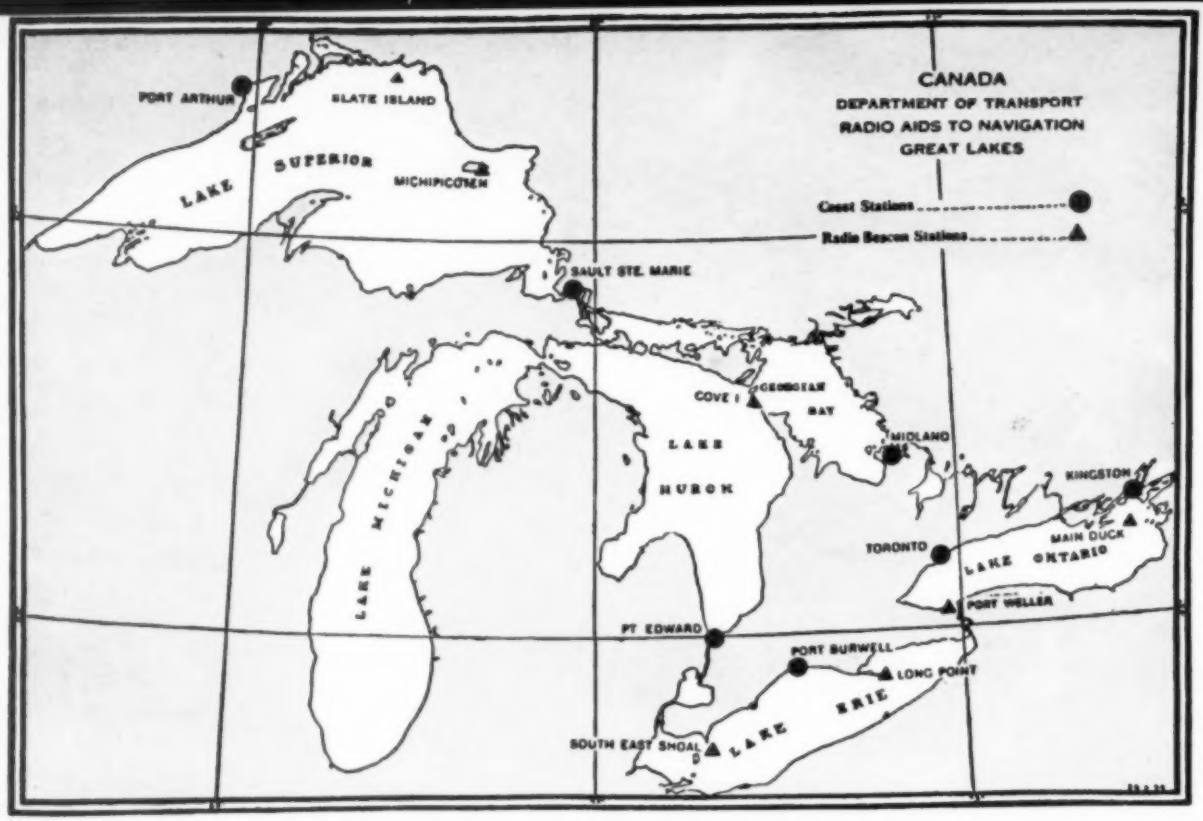
This service is augmented during the summer months by the CGS *Arras* (CGFD), which accompanies the fishing fleet and broadcasts by radiotelephone storm warnings and weather forecasts, and a message to fishermen.

The transmissions from this network of stations provide reception at any point along the Atlantic seaboard as well as on the banks fished by Canadian vessels.

For the benefit of navigators, to whom time within a fraction of a second is necessary if reasonable accuracy is to be attained in computing observations on celestial bodies, Camperdown, N.S., radio transmits time signals daily, except Sunday, at 0900 E.S.T.

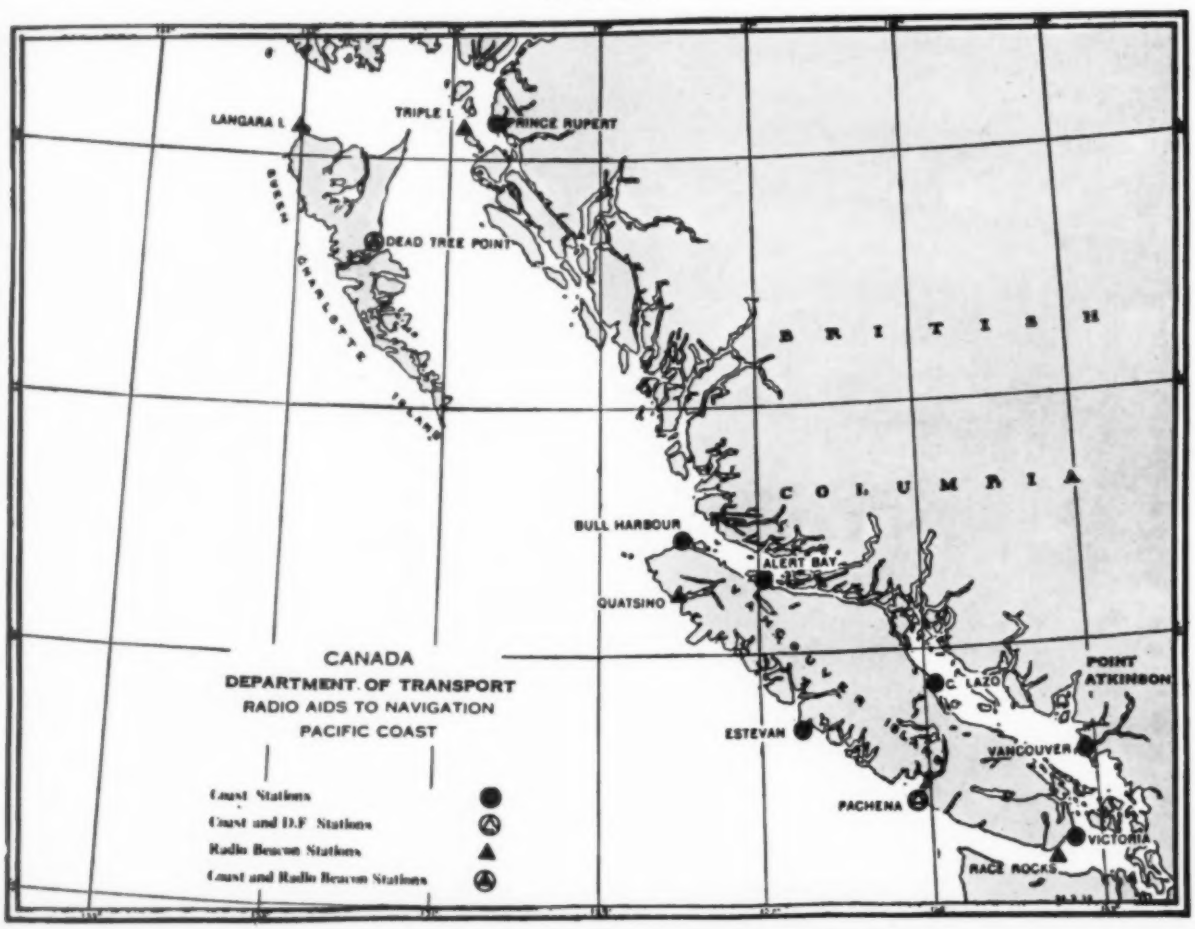
Since the sinking of the *Titanic* in April, 1912, an international ice patrol, supported and maintained by the maritime nations of the world, watches the traffic routes of the North Atlantic and reports the presence of icebergs to passing ships by radio. Canada has her own problem in this connection, that of combating ice which has accumulated in the lower Gulf of St. Lawrence prior to the opening of navigation to Quebec and Montreal each spring.

At the opening of navigation a departmental icebreaker investigates conditions

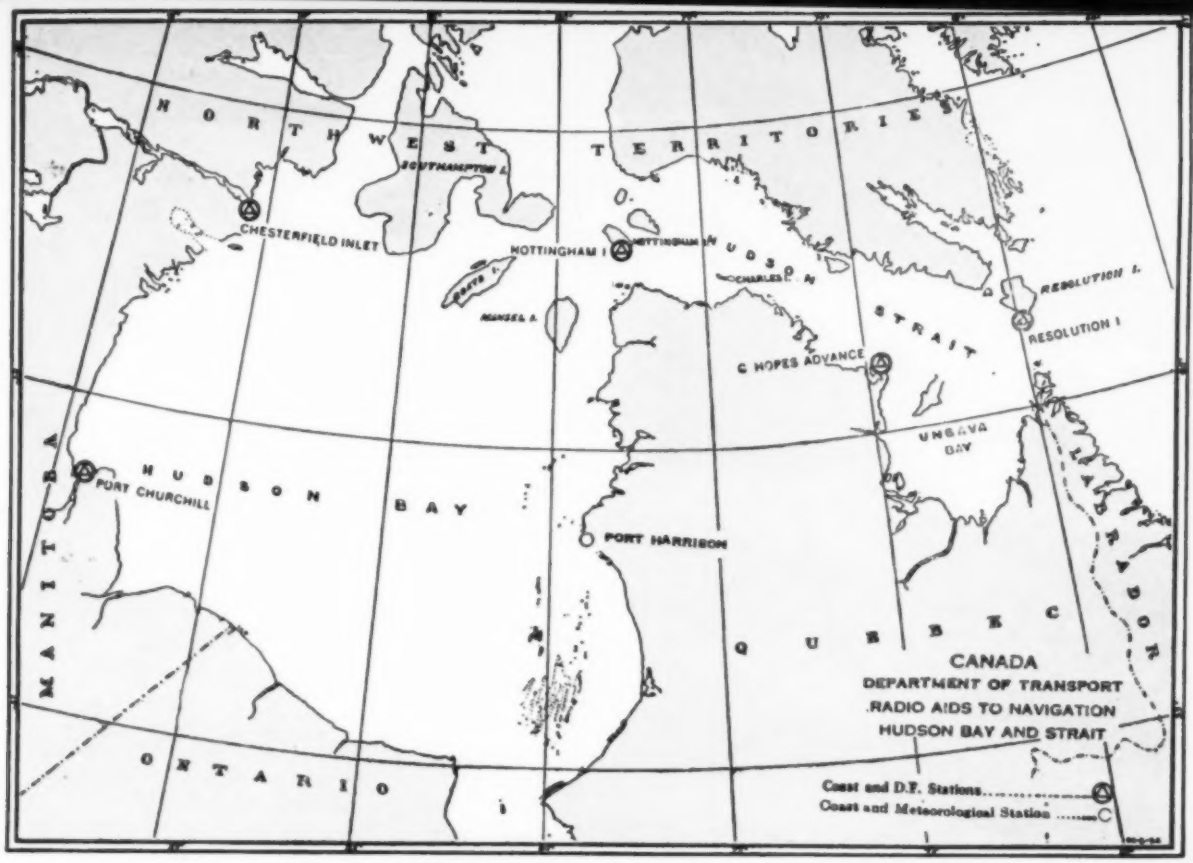


Great Lakes

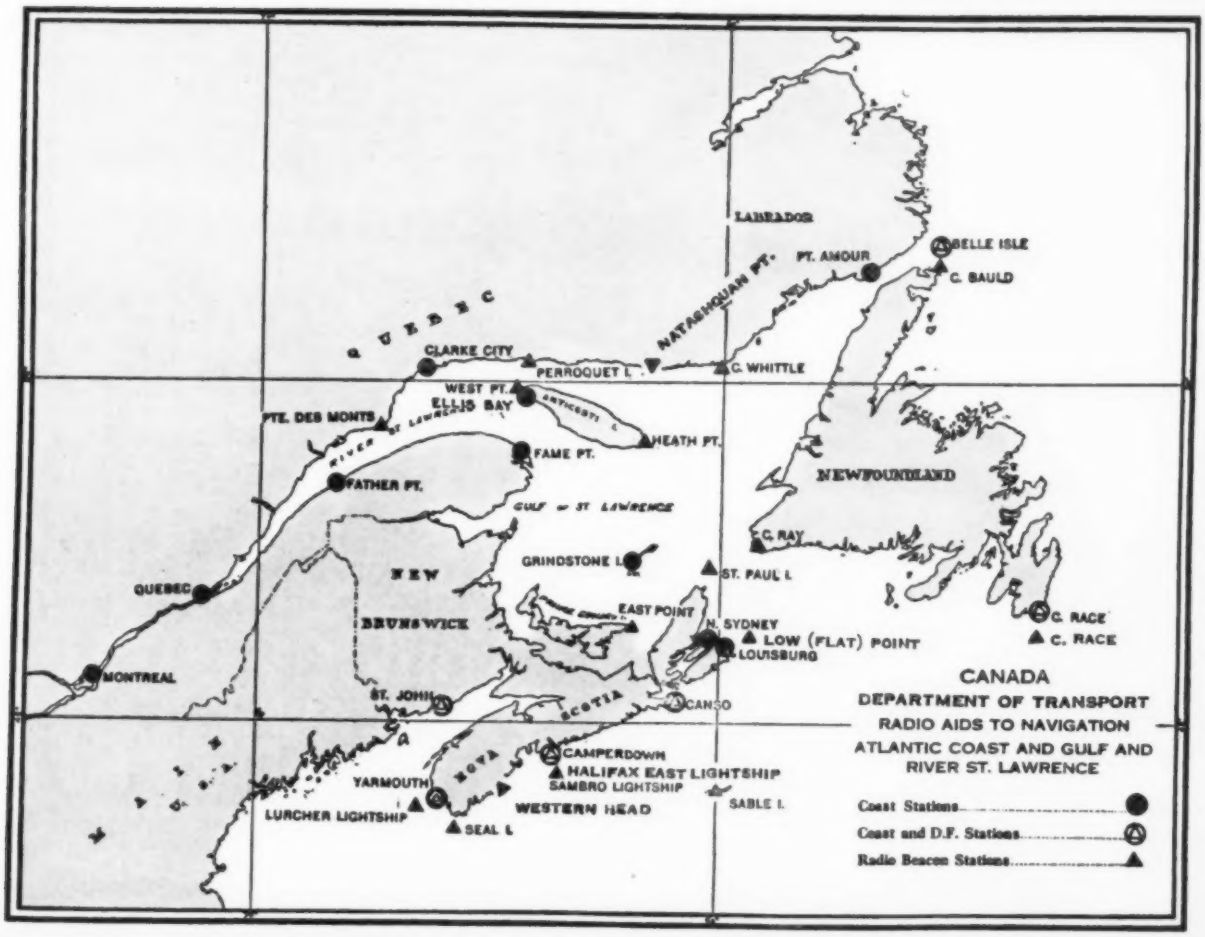
Pacific Coast

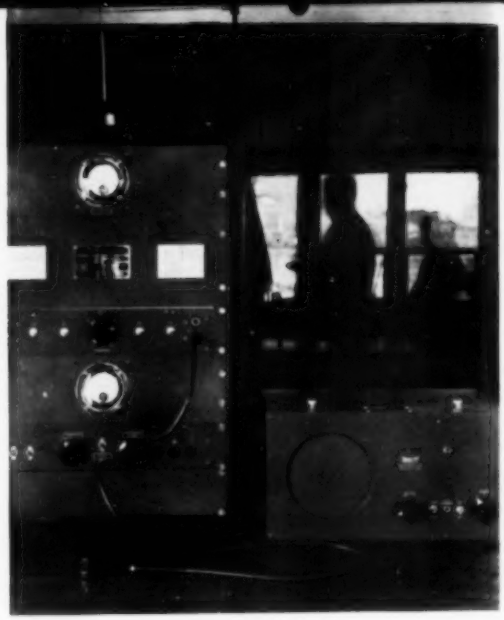


Marine radio aids to navigation operated by the



Top —Hudson Bay and Strait Bottom:—Atlantic Coast and Gulf of St. Lawrence





Top left:—Future wireless operators of the Canadian Navy undergoing a test at a West Coast Navy training barracks.

Above:—Radiophone installation on board C.S.L. steamer *Rentoyle*

Left:—*Santa Maria* on the high seas

Bottom left:—A wireless operator at his post aboard a minesweeper of the Royal Canadian Navy in Atlantic waters off the eastern Canadian coast

Below:—Just like any ocean-going craft, the flying-boat *Stranraer* has its wireless cabin. The machines keep in constant touch with their bases while they circle convoys or search the ocean for submarines or other hostile craft.

in the Cabot Straits. The ship cruises in the vicinity observing ice conditions, and every few hours obtains from all incoming and outgoing ships, and from a number of radio and signal stations, a detailed report of ice conditions in the different areas. These, in conjunction with her own observations, are compiled and analysed. A synopsis of location and drift of the ice, together with recommended routes, is broadcast twice daily.

Of the hundreds of vessels that ply the great inland seas of this continent, a large proportion make use of radio for conducting their business and as an instrument of navigation. Of recent years a quiet revolution has been going on in this field of communication. To-day wireless telegraphy, still the favoured means of communication at sea, has been largely superseded on the Great Lakes by radiotelephony. The convenience, speed and simplicity of this form of communication, plus the fact that it can be carried on from the bridge by the captain or the officer of the watch, has largely been responsible for the rapid growth it has made.

Besides enabling the captain of a vessel to talk directly with the captain of another vessel, or with one of the numerous coast stations, the usefulness of radiotelephony has been further extended by arranging for connection to the land line telephone system at a number of coast stations. For example, the Port Arthur station has recently been fitted with terminal equipment, which enables ships calling that station to be connected with any subscriber in the vast network of telephone systems.

The foregoing does not exhaust the full list of radio services to navigation. Others include ship-to-shore radiotelegraph and radiotelephony, both private and public, radio communications with pilot boats, the transmission of medical advice by the Department of Pensions and National Health to ships at sea, and the services of what are called visual signal stations which report the movements of ships not equipped with radio.

RADIO AIDS TO AVIATION

The radio services provided for aviation may be divided into two categories: first, those furnished on behalf of aircraft flying Trans-Canada routes, and secondly, those intended for aircraft flying transatlantic routes. This phase of radio in Canada is being rapidly developed, and it is expected that within a very short time aircraft pilots will be provided with as complete a service as is, at the present time, supplied to marine navigators. This service comprises a chain of radio range stations extending from coast to coast along the Trans-Canada airway and on important connection routes. These stations are located at airports approximately every 100 miles and transmit signals that enable pilots to navigate entirely by instruments. Routine weather reports are also broadcast hourly.

As of March 31, 1940, there were fifty-two stations in operation performing various types of services for different aeronautical routes. These included forty-three radio range and radiotelephone stations for the Trans-Canada route; five fan marker stations, one radio range, radiotelegraph and radiotelephone station at St. Hubert, Que., serving both the

Radio communication dissolves distances — all arms of the fleet are adequately equipped.

Radio has developed new eyes and ears for combatant services.

R.C.A.F men receiving instruction in radio in the well-equipped radio class-room at Trenton, Ontario.

Trans-Canada and transatlantic routes; one direction-finding station at St. Hubert, for the transatlantic route; and at Shediac, N.B., one direction-finding station and one radiotelegraph and radiotelephone station for the transatlantic route. There is also an auxiliary meteorological reporting station at Port Harrison, Que.

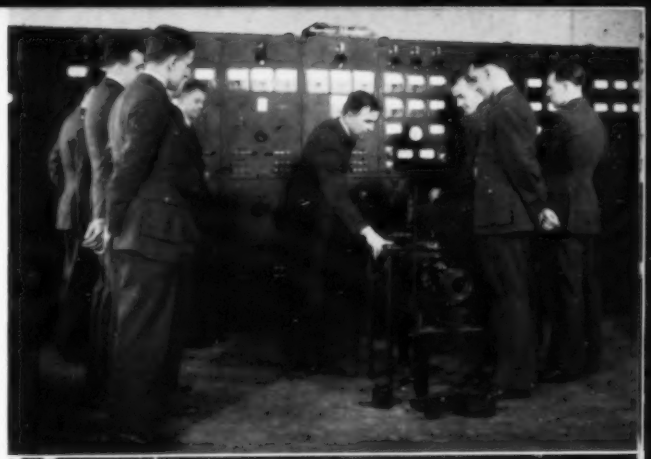
In addition to the navigational aids outlined above maintained by the Department of Transport, the Trans-Canada Air Lines and independent air transport companies operate services, of their own for plane-to-ground and aeronautical point-to-point communications.

POLICE RADIO SERVICES

Police radio stations have been installed for the purpose of providing communication between police headquarters and police radio-equipped automobiles in the following cities and towns:—Halifax, Sydney, N.S.; Saint John, Moncton, N.B.; Charlottetown, P.E.I.; Quebec, Sherbrooke, Granby, Montreal, Westmount, Verdun, La Tuque, Valleyfield, P.Q.; Brockville, Forest Hill Village, Windsor, Kingston, Ottawa, Cornwall, Belleville, Toronto, Hamilton, London, Brantford, Guelph, Kitchener, Peterborough, Port Arthur, Sudbury, Trenton, Niagara Falls, Ont.; Winnipeg, Man.; Calgary, Edmonton, Alta.; Saskatoon, Sask.; Vancouver, New Westminster, B.C.

The British Columbia Provincial Police operate nineteen radio stations at fixed points in British Columbia and seven portable stations throughout the province and five radio-equipped patrol vessels. These stations provide communication between police headquarters and the various units of the force.

The Royal Canadian Mounted Police are also alive to the value of radio and make extensive use of equipment maintained on their behalf by the Department of Transport.



Modern aviation is dependent upon reliable communication, and here radio plays its important part. At the airport is the communications office where is found the radio transmitting and receiving equipment; also the electric teletypewriter, where the weather conditions along the route are collected and recorded for the pilot's use. Planes are in constant communication with headquarters. Radio beam transmitters send out day and night the beam signals along which the pilot travels in any weather with assurance in the direction of his next port of call. Centre:—The instrument board in the cockpit of a passenger plane. Radio compass dial is in the roof; other radio panel below. Bottom:—Radio communication is maintained on various wave-lengths to which sets are kept tuned at all times necessitating a number of panels in operation at the same time.

Police departments in many of our cities and towns are using the new two-way radio system to speed up and provide more efficient service.

PRIVATELY OWNED COMMERCIAL STATIONS

It will be noted from the table on page 187 that there were ten limited coast stations, seventy-eight public commercial stations, and 863 private commercial stations in operation in the Dominion at March 31, 1940. Public commercial stations situated at Drummondville and Yamachiche, Que., provide transoceanic radiotelegraph and radiotelephone services to Great Britain and Australia, and a radiotelephone service to Newfoundland. The transmitting equipment is located at Drummondville and receiving equipment at Yamachiche, Que.

The limited coast stations are, as a rule, privately owned and provide a ship-to-shore communication service with ships owned or operated by the licensees only. The facilities of two such stations, owned and operated by the Canadian Marconi Company, are open to the general public. One is situated at Louisburg, N.S., providing a long-range radiotelegraph service to ships at sea and the other at Drummondville, Que., providing a long-range radiotelephone service to ships at sea by linking up with the trans-Canada Bell and provincial telephone systems across the Dominion.

The services performed by commercial stations, both public and private, are many and varied. Generally speaking, these stations are located in areas not served by telephone, telegraph, or other means of telecommunication. The majority of these stations perform a point-to-point radiotelegraph or radiotelephone service, al-

Royal Canadian Air Force transmitter receiver (below), ground receiver (right)

though an increasing number are being utilized for ground-to-plane communication. These stations provide an invaluable means of contact with mining camps, lumber mills, exploration and survey parties, trading posts, and many points that would otherwise be cut off from the more settled parts of the Dominion.

Private commercial stations may be used only for the handling of messages relative to the private business of the licensee, whereas public commercial stations may be used for the handling of messages for the general public.

The North-West Telephone Company operates a radiotelephone service between points in British Columbia hitherto telephonically isolated. The company has established seven permanent public commercial radiotelephone stations in that province. These stations are authorized to provide communication to twenty-one private commercial radiotelephone stations located at isolated points in that province. This company is also licensed to establish limited coast stations at Lulu Island and Prince Rupert, B.C., to provide a ship-to-shore service.

These stations, used in conjunction with the ordinary telephone exchange, provide a duplex radiotelephone service to the twenty-one isolated points and certain ships at sea.

The North-West Telephone Company is also licensed to provide emergency radiotelephone communication at any point in British Columbia and to carry out tests with a view to extending the existing radiotelephone service throughout the province.

On the south shore of the St. Lawrence, the Canadian Marconi Company owns a radiotelephone station at Rimouski, which provides radiophone service to stations at Baie Comeau, Shelter Bay and

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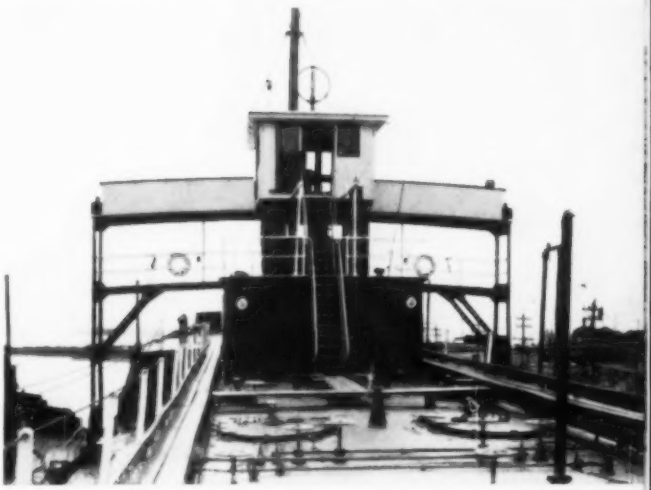

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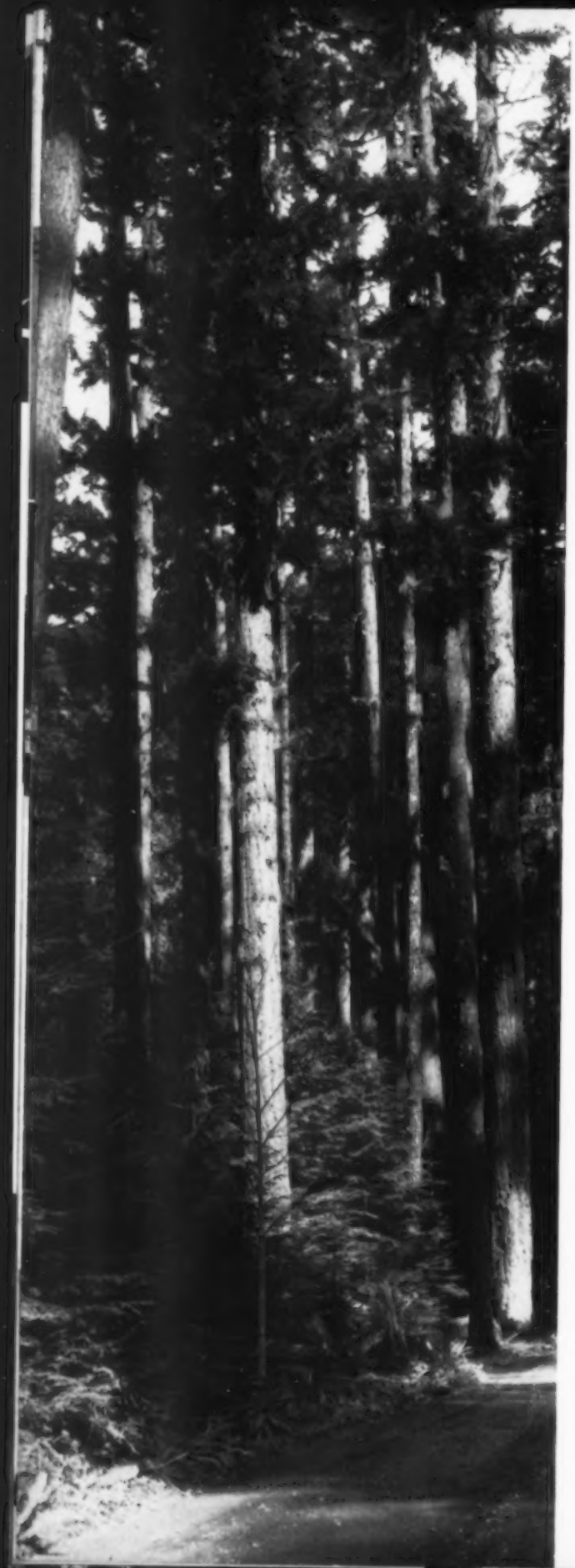
1. Fisherman on the Grand Banks using radio to set his course homeward.

2. Oil tanker equipped with radio direction-finder receiver. The D.F. loop aerial can be seen on the roof of the wheel-house.

3. Inside wheel-house and at left of wheel is the radio direction-finder receiver.

4. Wireless operator aboard patrol vessel, Pacific Coast



Chutes-aux-Outardes, P.Q. on the north shore, as well as to the M.B. *Jean Brillant* which plies the Gulf of St. Lawrence. The connecting stations are all owned by the Canadian Marconi Company, but leased to the Quebec North Shore Paper Company and the Lower St. Lawrence Navigating Company. The station at Rimouski connects to the National Telephone Company at that point and thence to the Bell Telephone Company and the world-wide telephone system.

Extensive radio facilities are provided for the North-western Ontario mining district. Four main stations, operated by the Department of Lands and Forests, Ontario, are located at Kenora, Sioux Lookout, Red Lake and Pickle Lake. The first two are located on the transcontinental railways and connect with the telegraph and telephone systems. The Red Lake and Pickle Lake stations are in thriving mining communities far back in the hinterland and otherwise without direct communication with the "outside".

This main network provides direct telephone connection between subscribers of local telephone companies in the mining towns and any 'phone on the vast telephone networks of the world. Privacy of communication is ensured by the use of "speech scrambling" equipment which makes conversation utterly unintelligible to unauthorized "tuning-in" on the circuit. Phone connection is also provided to a number of private radio phone stations at mining and construction camps in the vicinity.

Fast radiotelegraph service provides news and stock quotations as well as the usual message service.

The four stations also provide special communication facilities for subscribing aircraft companies which permit direct 'phone connection between the various offices and with their aircraft in flight.

An interesting example of the use being made of radio communication by large industries, whose activities centre in isolated districts not provided with line telephone or telegraphs, is the radiophone network of the Abitibi Power and Paper Company in the Lake Nipigon district. This network consists of six land stations

A quarter of a million men are employed each year to harvest Canada's forest crops and many more thousands to protect them from forest fires. A stand of stalwart giants in British Columbia.

Leonard Frank photo

and three tugs used for towing booms, or rafts, in Lake Nipigon. The equipment is operated by the Abitibi Company and provides the fast communication essential to their lumbering operations. Communication with the company tugs on Lake Superior further extends the usefulness of the system.

Provincial governments and private organizations use radio extensively in forestry work. The provincial stations are as follows: Ontario, 137, including 5 aircraft; Manitoba 8, including 1 aircraft; Saskatchewan, 26; and British Columbia, 146, including 11 patrol vessels and 3 Game Commission vessels.

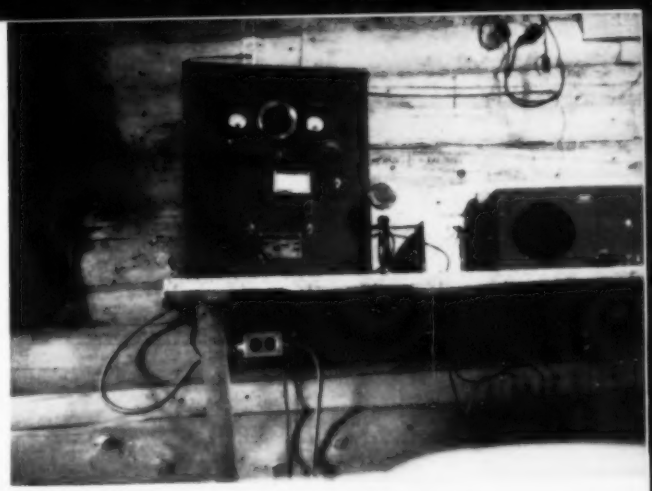
Public utilities and power companies use radio to provide emergency telegraph and telephone communication between their power plants and distribution centres. One hundred and twenty-five licences for such stations were issued during the fiscal year 1939-40, including sixty-one receiving stations in patrol cars.

Licences were also issued to mining companies throughout the Dominion to cover the operation of seventy-six radio stations and twelve aircraft radio stations.

Other companies operating aircraft were licenced for one hundred and one ground radio stations and one hundred and forty-four aircraft radio stations.

BROADCASTING

Canada's first broadcasting station was set up in Montreal in September, 1918, by the Marconi Wireless Telegraph Company (now Canadian Marconi Company). Its call letters were XWA, and the programme consisted of gramophone recording from an old Swedish music box, weather reports, and news items. Subsequently, in 1922, a studio was equipped and the call letters CFCF were assigned to the station. At this time there were a number of firms in Canada supplying broadcasting equipment



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SAFEGUARDING ONTARIO'S FOREST RESOURCES

Radio communication solves the problem of effective communication for one-time isolated forest regions and patrols. After years of research, special equipment has been evolved to keep all units in touch—aeroplanes, the lookout tower, the man on patrol, the motor car, fire rangers' cabins and headquarters. (1) Radio equipment in ranger's cabin. (2) O.F.B. forest ranger using portable set in bush. (3) Radio-equipped motor cars at a fire. (4) O.F.B. aeroplane.

and reception apparatus. No less than fifty-two private, commercial and amateur broadcasting licences were granted during the fiscal year 1922-23.

To-day there are ninety-six stations in Canada, the majority of which can be combined in a great national network. All but ten are privately owned and operated commercially. The remainder are either owned or leased by the Canadian Broadcasting Corporation.

The Canadian Broadcasting Corporation came into existence on November 2, 1936, succeeding the Canadian Radio Commission. Its structure represents the final conclusion of several years of consideration of national broadcasting by a Royal Commission and a succession of Parliamentary Committees. It constitutes in practice a working compromise between the principle of complete state control as practised in Europe, and most countries outside, and the principle of private initiative on a commercial basis as practised in the United States. The Canadian Broadcasting Act of 1936, under which the Corporation operates, provides that it shall consist of a Board of nine Governors, representative of the principal geographical divisions of the Dominion. This Board determines and supervises policy, while the actual administration and operations are under the direction of a General Manager. The CBC is empowered to issue regulations of a general character applicable to all broadcasting in Canada, but it does not otherwise interfere with the freedom of choice in programmes of privately controlled stations. The main purpose of the private stations is to serve the locality in which they operate. In November, 1936, just after the CBC began to function, it served less than fifty per cent of the population. At that time a survey of the situation from an engineering point of view was undertaken, and a nation-wide project, which, when completed, would bring public service radio to almost every home in the country, was drawn up. This project is still in process of realization but much has already been achieved, and, at the present time, over ninety-two per cent of the population is within the coverage of the CBC network. This network includes thirty-five permanently connected stations across the continent, and thirty-five more which may be added, if and when the occasion justifies. Sixteen other stations in Canada, not included either in the basic or the supplementary network, can also, on short notice, be made available to co-operate with other Canadian stations.

During 1939 the CBC completed construction of its fourth 50,000-watt transmitter, CBK, at Watrous, Sask. The others are: CBL, Toronto; CBF, Montreal; and CBA, Sackville, N.B. With the inauguration of CBK, the power of CBC-owned stations increased to 212,000 watts, or three-quarters of the power of all stations in Canada. At the beginning of 1937 the power of all stations in Canada was 79,000 watts.

CBC's western 50,000-watt station CBK. Transmitter panel, showing part of the visitors' foyer with its interesting map-of-Canada floor treatment and the operator's supervisory console.

CLASSIFICATION OF CBC PROGRAMMES, SHOWING PERCENTAGE DISTRIBUTION, FISCAL YEAR 1939

Class of Programme	Programmes	Hours	Percentage of Hours	Class of Programme	Programmes	Hours	Percentage of Hours
	No.	No.			No.	No.	
Band music	211	112:45	1.2	Recitals—			
Chamber music	403	160:00	1.7	Instrumental	956	279:35	3.0
Children's programmes	434	113:30	1.2	Vocal	1,463	362:45	3.9
Choral music	398	143:30	1.5	Recordings	3,300	1,273:55	13.7
Dance music	2,919	1,124:35	12.1	Religion	171	94:00	1.0
Drama	646	261:20	2.8	Rural and farm broadcasts[2]	296	119:05	1.3
Grand opera	22	61:15	0.7	Sacred music	141	56:00	0.6
Light Orchestral and Vocal—				Special events	400	220:55	2.4
Standard	1,291	552:35	5.9	Sport broadcasts[2]	151	36:10	0.4
Popular	2,355	869:15	9.3	Stock quotations	854	231:00	2.3
News bulletins	4,193	989:20	10.6	Symphony	401	325:15	3.5
News commentaries	202	55:30	0.6	Talks—			
Northern messenger[1]	18	16:30	0.2	Informative	2,008	507:40	5.4
Old time music	204	79:05	0.9	Educational	309	111:45	1.2
Organ music	566	226:35	2.4	Variety	1,511	789:05	8.5
Poetry reading	119	35:25	0.4	Women's programmes	218	82:00	0.9
Public service	63	13:50	0.1	Royal visit rebroadcasts[1]	49	24:45	0.3
				Totals	26,272	9,306:15	100.0

[1] Seasonal or of a special nature, and not carried throughout the year. [2] These figures are not for a complete year as these classifications were not tabulated separately before July, 1939.

Network facilities require over 7,000 miles of special telephone lines, leased from the operating companies.

The above table gives the classification of CBC programmes during the fiscal year ended March 31, 1939. Following the outbreak of war there have been, naturally, changes by way of more frequent news broadcasts, overseas rebroadcasts, as well as other programmes appropriate to war-time conditions.

Since there are probably more household radio sets in Canada than bathtubs, it is easy to think of radio only as an ingenious device by which one can listen or not, at the turn of a knob, to the news, a ventriloquist's dummy, a Prime Minister speaking, a hysterical, tortured voice in Berlin, or any of the multitude of programmes that fill the air, according to one's judgment or fancy. Yet the more mundane radio developments play a vital role affecting the lives of every one, even of those who never have any direct connection with them. As a matter of fact, broadcasting occupies only a small section of the total spectrum of electro-magnetic frequencies used by radiotelephony and telegraphy.

THE INDUSTRY

The manufacture of radio apparatus is an important industry in Canada. The range of products made is quite wide, much wider in fact than is generally realized.

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1. Modern CBC station, CBK, at Watrous, Saskatchewan

2. Two technicians from the R.C.A.F. examining several radio transmitters ready for shipment to various points in Canada. These transmitters, developed in Canada to rigid specifications, are for the use of the R.C.A.F. for point-to-point and ground-to-aircraft communications.

3. Assembly of the transformers. Girls add the iron laminations that surround the coils. Trained technicians, using special equipment, check the finished unit for possible defects.

4. An assembly of individual sections of radio transmitters.

5. Science guides, controls, checks every operation and process. Daily samples from every stage of production are rigorously inspected by highly trained technicians.

6. New tools are fashioned from raw steel; tools used in the factory are repaired and machined accurately to within one-ten-thousandth of an inch.

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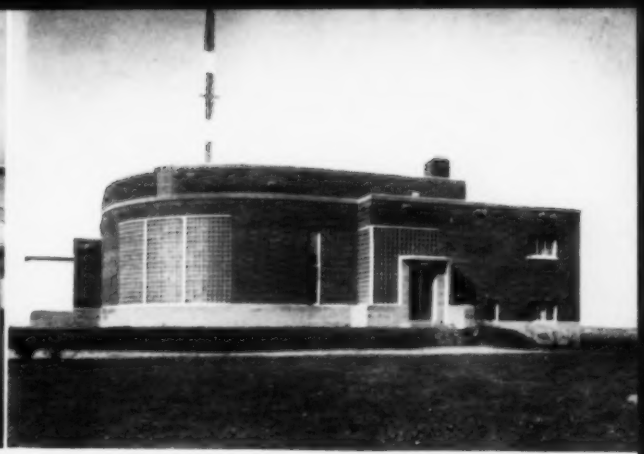

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7. Two of Canada's Air Force technicians examining some of the test equipment designed to measure the performance of aviation radio at both high and low extremes of temperature, such as may be encountered in climates all over the world.

8. The new modernistic CBA station at Sackville, N.B.

9. The wax disc on which the first recording is made is specially developed to record the minutest vibrations of the recording needle with the utmost faithfulness. Sound grooves being examined by microscope for possible flaws.

10. Matrices are mounted in pairs on the record press. On the lower matrix is placed a wad of smoking black "dough". The press closes, squeezes, and, when it opens, we have record.

11. War-time operation—making up mess tables for the troops.

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Two-hundred foot latticed transmitting aerial towers, Glace Bay, used in early transoceanic radio communication.

Marconi transoceanic beam wireless towers, Drummondville, Que.

Some of the items are broadcast transmitters, ship radiotelegraph and radiotelephone transmitting and receiving equipment, microphones and parts, public address systems, portable receivers and transmitters for forestry patrol, transoceanic radio equipment, aviation and police radio, direction finders and beacons, maritime depth sounders, antennae, tubes and cabinets, as well as broadcast receivers for car, or home, and phonograph radio combination.

Statistics covering the amount of capital, labour and other factors relating specifically to the radio business are not available since all manufacturers and merchandizers handling radio products are also engaged in a variety of other operations. It is not possible to distinguish statistically between the factors employed in the radio industry and those related to other operations. The market created by the development of broadcasting and the widespread ownership of radio receiving sets now constitutes the largest part of the business of the industry in Canada.

At the present time there are twelve companies manufacturing radio receiving sets. The radio-set industry is one of the newer industries. In a period of roughly fifteen years for which statistical data are available, it has faced a wide variety of different situations. In the first years there was a completely fresh market and the problems were mainly those of production. Subsequently, the industry faced depression years in which sales fell drastically and a large number of manufacturers ceased operations. During the last five years sales have shown a substantial recovery notwithstanding some evidence that the market is beginning to show signs of saturation.

The table below shows an almost continuous growth in production since 1925, when statistics were first published.

The figures in the above table indicate the remarkable decline in the average cost of a set. Concurrent with the falling prices, efficiency in operation has increased. The modern radio receiver bears about the same relation to its predecessor as the modern motorcar bears to the horseless carriage of years ago. In fact, the difference is so great that it is hard to make any realistic comparison of retail prices

PRODUCTION OF RADIO RECEIVING SETS IN CANADA, 1925-1939

Year	Number of Sets	Selling Value at Works(x)	Year	Number of Sets	Selling Value at Works(x)
		$			$
1925	48,531	2,278,292	1933	112,272	4,401,313
1926	42,430	2,253,098	1934	188,710	8,196,248
1927	47,500	3,748,622	1935	191,203	9,493,399
1928	81,032	7,486,127	1936	253,896	11,388,173
1929	150,050	15,604,145	1937	289,247	11,696,717
1930	170,082	19,196,936	1938	242,721	8,801,981
1931	291,711	18,555,710	1939	348,507	8,678,130
1932	121,468	6,808,877	1940	492,655	—

(x) Not list prices

CLASS OF STATION	1936	1937	1938	1939	1940
	No.	No.	No.	No.	No.
Coast (Government)	31	31	31	31	28
Direction finding (Government)[1]	13	13	13	13	13
Aeronautical direction finding (Government)	Nil	Nil	2	2	2
Ship (Government)	56	58	59	61	64
Ship (Commercial)	212	261	313	340	356
Ship (Commercial) receiving only	Nil	Nil	Nil	Nil	71
Radio beacon (Government)	24	26	26	26	26
Radiophone (Government)	9	10	10	10	17
Weather-reporting (Government)	Nil	Nil	1	1	1
Land	1	1	1	1	1
Limited coast	5	5	7	10	10
Public commercial	36	41	58	81	78
Private commercial	275	315	399	489	863
Private commercial broadcasting	78	80	88	94	96
Experimental	82	126	147	182	78[5]
Amateur experimental	2,380	2,821	3,222	3,678	3,776[5]
Amateur broadcasting	Nil[2]	Nil	Nil	Nil	Nil
Experimental short-wave broadcasting	10	8	8	Nil[3]	Nil
Private receiving[4]	862,109	1,038,500	1,104,207	1,223,502	1,345,157
Radio training school	6	5	6	7	9
Licensed aircraft	4	7	91	129	156
Aeronautical radio range (Government)	Nil	Nil	13	31	43
Commercial receiving	Nil	Nil	5	64	86
Commercial receiving (Special)	Nil	Nil	Nil	Nil	10
Fan marker (Government)	Nil	Nil	Nil	1	5
Aeronautical ground to air stations	Nil	Nil	Nil	Nil	2
Totals	865,331	1,042,308	1,108,707	1,228,753[5]	1,350,948

[1] One combined direction-finding and radio beacon station included in total of direction-finding stations, and one combined coast and radio beacon station shown in total of coast stations. [2] This class of station discontinued April 1, 1935. [3] This class of station discontinued April 1, 1938. [4] Figures include licences issued free numbering 5,862 in 1939-40, 4,557 in 1938-39, 3,155 in 1937-38, 2,758 in 1936-37, 2,314 in 1935-36, and 1,931 in 1934-35. [5] All licences for privately owned experimental stations were suspended at the outbreak of war.

particularly in view of the variety in models. The modern all-wave electric receiver, with tone control and automatic tuning, in its handsome cabinet, can be bought to-day for a fraction of the price of the mantel battery models of a few years ago.

During the first quarter of 1940 producers' sales of radio receiving sets in Canada established a new record at 71,503 units, having a list or retail value of $3,524,190. The number of sets sold was greater than in any first quarter period since the Bureau of Statistics commenced collecting quarterly data on radio sales in 1934, and exceeded the figures for the corresponding three months of a year ago by seventy-six per cent.

Volume of sales in 1940 was the highest on record at 438,976 sets, the comparative totals for other years being 370,568 in 1939; 251,259 in 1938; 265,855 in 1937 and 247,920 in 1936. Analysis of the sales by provinces during the year under review shows that Ontario took 195,099 sets or 44.4 per cent of the total; Quebec, 78,321 or 17.8 per cent; Maritimes, 41,444 or 9.5 per cent; British Columbia, 40,241 or 9.2 per cent; Manitoba, 38,054 or 8.7 per cent; Alberta, 26,319 or 6.0 per cent, and Saskatchewan, 19,498 or 4.4 per cent.

CONTRIBUTION TO THE WAR EFFORT

Over the last nineteen months the Canadian nation has been at war and consideration of any field of activity or endeavour is incomplete without taking into account in what manner and in what measure it contributes to victory. Radio is an indispensable adjunct of modern warfare, no less important on the home front than in combat.

Armies go into the field now with their activities directed by orders radioed. Each company of infantry, each armoured divi-

Interior Marconi beam wireless transmitting station, Drummondville, Que.

1. After lacquering, radio cabinets are polished with infinite patience.

2. Great kilns where wood is seasoned to the exacting requirements of cabinet builders.

3. Sheets of finest wood are matched, glued together and veneered on the surfaces of the solidly built cabinets.

4. The cabinets await their turn for the application of lacquer. The finish is applied by a power spray in specially constructed booths.

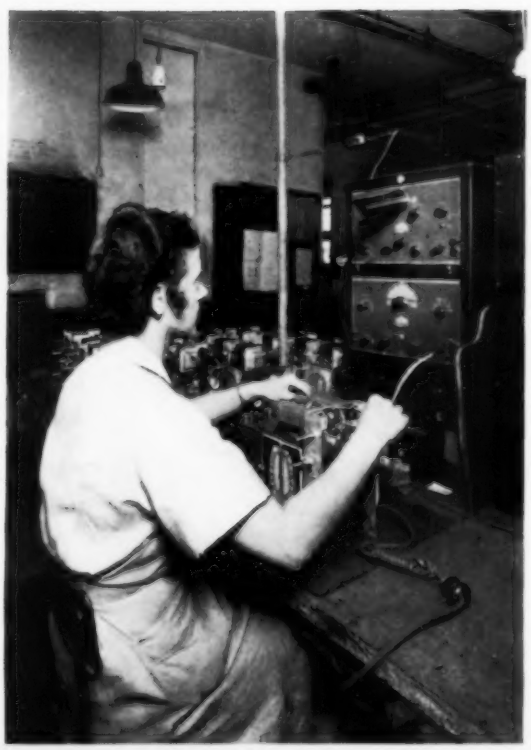
5. The girl watches the view piece of the latest oscillograph where curved graph lines, thrown on a fluorescent screen, reveal the performance of every portion of the set.

6. Dexterous hands perform the delicate task of constructing loudspeaker cones.

7. Whirring spindles wind with great accuracy the many paper capacitors used in every set.

8. In the background is shown a line of completed cone-of-silence marker transmitters, ready for the use of the Canadian Airways, as position markers.

9. These highly trained technicians work in a huge cage of copper screening. Here every set is given a final check-up before shipment.



sion, carries its portable equipment as it deploys in battle. Artillery fire is directed by radio from observers in planes or balloons. Tanks, aeroplanes and battleships are directed and controlled by radio. Equally important, the leaders of the nation depend upon that medium to inform and fortify the people. Important messages have frequently been delivered within a few minutes, even a few seconds, after it has become necessary to do so. Events are described to the nation and the Empire as they occur. The CBC's overseas staff have kept Canadians in close touch with happenings in Great Britain. News and its interpretation by able commentators, is radiated from every broadcast station in Canada. Such broadcasts as those from the beleaguered capital of the Empire portray the example of glorious courage with an inspirational quality unsurpassed by any other means of communication.

The job of producing radio equipment for the defence forces must be done, and is being done quickly by Canadian industry. Moreover, the well-equipped facilities of the radio industry are being adapted for the production of numerous other things imperatively needed. The R. C. A. Victor Company for example, has partially converted its radio cabinet-making division to the manufacture of mess tables and other barracks furniture, and this is but one instance.

There is an urgent need for those who know how to operate and service transmitting and receiving equipment.

The heavy demands in all phases of radio are being met in Canada to-day in a manner worthy of the courage, initiative, and vision that marked its early beginnings in this Dominion.

* * *

Grateful acknowledgment is made for photographs supplied through the courtesy of Canadian Marconi Company; R. C. A. Victor Company, Limited; Northern Electric Company, Limited; Director of Public Information; Royal Canadian Navy; Department of Transport, Ottawa; Lockheed Aircraft Corporation; Manitoba Telephone System and Ontario Forestry Branch.

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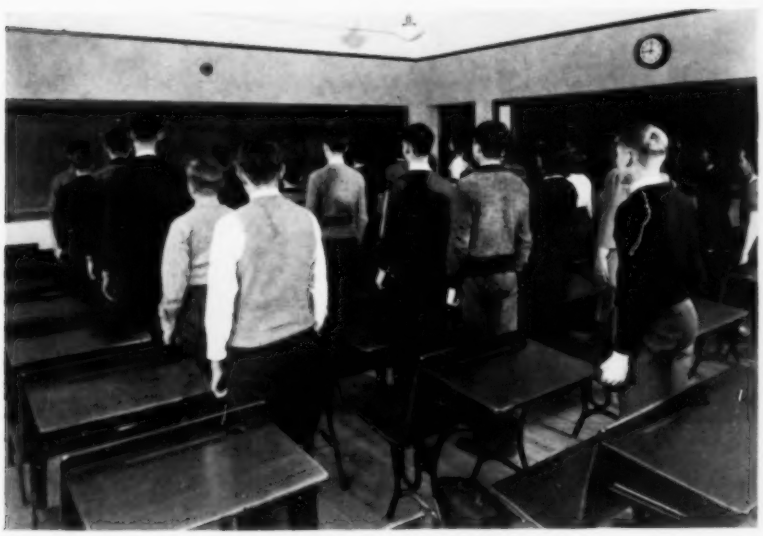
Field radio crews engaged in sending messages to direct artillery work for troops in training at the Vimy Barracks, near Kingston, Ontario.

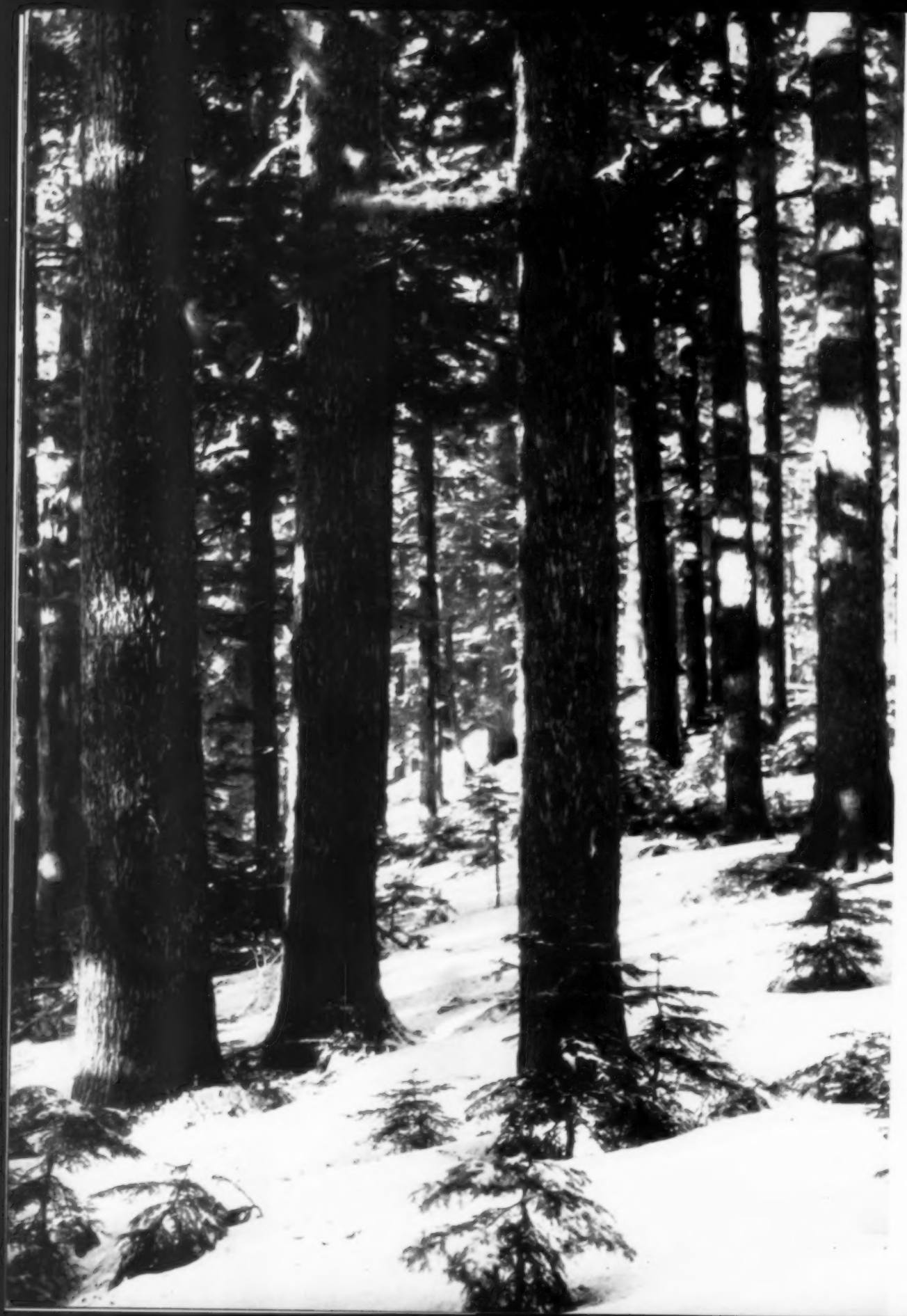
Members of a motorized unit of the R.C.C.S. at work in the wireless classroom at the Vimy Barracks.

In modern warfare every branch of the service requires trained operators. A wireless class at Camp Borden, Ontario.

Centre right:—In to-day's modern churches the electric organ, a creation by radio sound engineers, enhances the beauty of sacred music.



The use of radio communication in school work is a relatively new development. It permits the principal to be in constant touch with each classroom. It simplifies instruction in public speaking, school exercises, language instruction, recreation, etc. Scenes in the Collegiate Institute, Chatham, Ontario.



TREES OF OUR WESTERN FORESTS

by **HAMILTON M. LAING**

Photos by author

ALMOST every one on first visiting Western Canada, either the mountain realms or the coastal country, is impressed by its forest growth. Even world-wide, the very name of British Columbia is synonymous with huge trees, timber, lumber. Everything pertaining to forest or timber products carries a sense of bigness about it. The trees are huge of stature, lumber per stumpage-acre is vast; the mills with their devouring saws are gargantuan; yearly export in board feet gives figures like the national debt. But when we come down to examine our trees as trees in the light of what a high type of tree really stands for — other than as a commercial entity—, even a dyed-in-the-wool westerner admits the shortcomings of these coastal forests. Size, age, duration, would seem to be their characteristics, utility their forte. The western forests are mainly coniferous — the lowbrows and primitives, botanically speaking. They provide evergreen charm to the landscape throughout the year. When young especially, the foliage of the western cedar or Douglas fir and white fir gives them an exceeding beauty—Christmas trees of grace and loveliness *par excellence*. When ancient, however, theirs is the appeal of size, vastness. Then, in this region there are no commercial hardwoods. Broad-leafed trees are in no great abundance and most of these are soft. Of this group, including the striking and ornamental madrona, the Garry oak, western birch, poplars and tree alders and

Left:—The western hemlock (Tsuga heterophylla), here shown in a stand of its own, is usually mixed with Douglas fir and western cedar.

Top right:—Because the Yellow pine (Pinus ponderosa), product of the dry belt of southern British Columbia, grows well scattered, it is able to express some tree character and get away from the gun-barrel straightness of the white pine (Pinus monticola) that hides itself in the dense woods.

Bottom right:—A larch grove of the Kootenays. This larch (Larix occidentalis) is something more than the tamarack of the East. In its openness and airiness it makes one of the really beautiful forest scenes of the West.

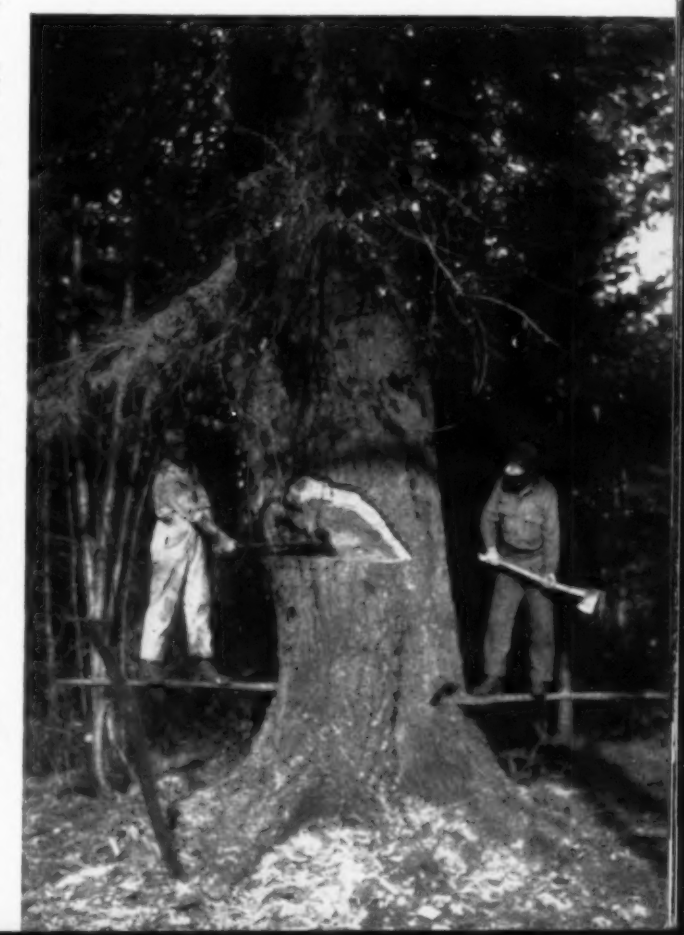
The western cedar (Thuja plicata) is one of that trio of timber trees known world-wide: cedar, hemlock, Douglas fir. The cedars shown are small. The patriarchs of these are veritable cathedrals of the forest, standing as though to outlast the ages.

three species of maples, only the first three have hard wood. Nut-bearers are absent and there are no elms or ashes. It is mainly fir, spruce, hemlock and cedar out there or nothing, plebeian quantity of softwoods rather than highbrow quality of hardwoods — but then softwoods provide seventy-five per cent of the world's timber requirements.

Because of its peculiar terrain, sea-level to timberline in high mountains, the West would seem to offer a vast range of habitat for variety of trees; yet, high or low, the conifers rule. Because of this range of elevation there are alpine forms to fit it, and so we have such westerns as alpine fir, mountain hemlock, white-barked pine, limber pine and Lyall's larch — trees for which there are no equivalents in the East. Again several well-known eastern trees have their western relatives: western white pine, western hemlock, western cedar, western larch, etc., all to be recognized at once for what they are by the visitor. Yet the sight of a western dogwood — especially if in flower — or a red-barked madrona, goes a little way to inform the new-comer that the West, even beyond the realm of its big trees, has a touch here or there distinctly its own.

It is usually a difficult thing to photograph perfectly the coniferous giants of the West, and many of these, to be appreciated, must be seen towering in the forest. No artist would wish to paint them singly; they show at their best only in stands — clean-boled, limbless till far aloft, a gun-shot from the forest floor. Only when raised in the open can they stand alone; forest-raised and deprived of their fellows, they fall. Thus the western white pine (Pinus monticola) stands in the gloomy forest, a grey gun-barrel, a mighty flag pole or the mainmast of an old-time queen of the waves. You can get acquainted with only its trunk; you may pick its long slender cones — six inches to a foot in length — from the needle-strewn earth, but, to finger its long five-bunched slender needles, you would need the climbing skill of a high-rigger. The latter, be it understood, is one of the human monkeys of the logging works employed in laying tackle high above the earth on such towering timber.

The limber pine (Pinus flexilis) and white-barked pine (Pinus abicaulis) are two rather similar trees of the mountains at high elevations — 5,000 feet and over. Both usually are picturesque little warriors stunted by the elements, often; indeed, reduced by adversity to mere shrubbery. These are trees reserved mainly for the eyes of the hardy alpinist or trail-riding tourist of the brief summer. The white-barked pine gets its name from its whitish bark, the limber pine from its flexible younger branches. The leaf arrangement is similar in both in that the rather short rigid needles are borne in clusters of five, but notable differences are that the bark of older trees of limber pine turns brownish and the cones are markedly larger. Cones of limber pine run from four to ten inches in length and are of lighter or yellowish-brown colour; those of the white-barked pine are shorter and rounder, one and one-half to three and one-half inches long and dark brown in colour — the large "nut-lets" below the thick scales, a favourite



A lowland white fir (Abies grandis) comes down. Though often a large tree, its wood is soft and wet, the trunk often 'dozy' at heart, and it is too short-lived to reach the proportions of better trees such as the Douglas fir.

titbit of several mountain birds and mammals.

The yellow or ponderosa pine (Pinus ponderosa), on the other hand, is a great, beautiful tree of low elevation, plain for all folk to see. But its alligator-hide bark, gleaming warm reddish yellow, and its long leaf-clusters — the needles arranged usually in threes — will be found only in the sub-humid and moisture-deficient (driest and hottest) parts of southern British Columbia — the California of Canada. This is not only a mighty tree, lovely to the eye of the artist as to the lumberman — for it is no mere naked spar, but heavily armed and broadly crowned and stately, — and distinctly a product of the West only.

It is the lodge-pole pine (Pinus murrayana) that for gun-barrel straightness and slenderness quite takes the palm. Of small size, it always made the best teepee poles for the Indian, and of larger size — for it commonly runs in stands of a foot diameter — it makes the finest log cabins in the world. Sometimes on the stump it reaches even two feet. It is another of those western trees that seldom can be appreciated alone. It must be seen standing in its clean stands on the mountainside, each erect in its place like a company on dress parade. Though a "gun-barrel" commonly, there are many places where this westerner, as in the Rainbow Mountains of British Columbia, may be found in open park-like groves, the tree individually assuming spreading and picturesque form.

When we come to the larches, the West has about everything. The 'tamarack' of the East is, well, just tamarack; but we must call this great towering dead-straight giant of the Kootenays or Okanagan country (Larix occidentalis) a 'larch'. Deeply furrowed in its richly reddish-brown bark, when in the autumn high aloft in the small crown, its fine deciduous leafage has turned to gold, this tree is truly a creation of beauty. A grove of them then brings up the lines: "The groves were God's first temples". The larch forest is lovely because there is an airy openness to it; none of the gloomy, green-jungle effects of the sea-level forests of the coast country. The larch grove probably gives us as beautiful a sight as can be seen among the conifers of America anywhere.

Another western larch, Lyall's, (Larix Lyallii), is a tree reserved almost entirely for the mountaineer of the Rockies. Rarely seen under 6,000 feet, it is smaller than the other larches mentioned here, and less symmetrical, but far more picturesque, in keeping with its alpine home. When, in September, its golden foliage is painted against the whiteness of the first snowfall as it is seen by the late tourist at Lake Louise, looking aloft to higher slopes, or at Lake Agnes, then it goes far to produce one of the most delightful scenes of the mountains.

Like many other western trees, at least one of the spruces is noteworthy, mainly on account of its size. The Engelmann spruce (Picea engelmannii) is a lover of high elevations in the Rockies, Cascades and much of British Columbia other than the coastal region, and is somewhat similar to the eastern white spruce (Picea canadensis) which also enters this province in the north-east. The two latter spruces are in no way very striking, but, down in the coastal humid belt, the Sitka spruce (Picea sitchensis) is a giant of stature and catches our admiration and takes away our breath because of its very immensity. This great tree, "aeroplane spruce" during the Great War, is seen at its finest on the rich, moist coastal flats where its mighty trunk, the bark small-scaled and smooth, shoots skyward with geometric straightness, limbless for a gunshot — mere timber, or a creation of great beauty, rather according to the point of view of the beholder.

An exhibit of the Canadian Forestry Association at the Canada Pacific Exhibition 1935 showed a Sitka spruce 637 years old when cut down; it was 7 feet 8 inches in diameter, began life in 1297 and took an average of 12.8 years to grow an inch.

Another mere 'timber tree' of this region is the western hemlock (Tsuga heterophylla). As a small youngling raised in the open, this hemlock, with its slender curving tip and delicate foliage, is very beautiful. But western hemlock is only typical of its region as it stands in the shady green forest, straight and limbless, seldom in exclusive possession of its acreage, but sharing it with cedar and Douglas fir. The hemlock trunk even resembles that of the fir, especially in the ancient trees that with years grow more seamy and roughened of bark.

The small, mountain hemlock (Tsuga mertensiana) of high elevation, just as with pine and larch, carries most of the beauty and individualism of the family. Hemlocks of the dark forest are as alike

as soda crackers; hemlocks of the high skyline are little old individualists, every one a gnarly warrior that has won his battle in his own way in a hard world. Visitors, on meeting the two hemlocks of the West, are always struck by the difference in the cones, the great western hemlock of the forest strewing the path with tiny cones under an inch in length, while the gnarled little runt of the skyline often bears cones three times as long! Western cones indeed make a wonderfully interesting exhibition. From the huge eighteen-inch cone of the sugar pine — which mighty tree, next to the redwoods in stature, unfortunately does not enter Canada — down to the tiny product of the hemlock, every one is an unfailing index to the parent that shed it on the forest trail.

The Douglas fir (Pseudotsuga taxifolia) is one of the commonest trees of the region under consideration, reaching its greatest development on the coastal flats, but yet found in abundance throughout the mountain areas. Imposing only in its vast green cathedrals, in most minds, it is mere lumber. Like hemlock and spruce, if grown in the open, it spreads its low skirts upon the ground, forms a cone, each tree like every other. It is fast-growing, uninteresting except for the immensity that in some towering five- or six-century giant strikes us dumb by its sheer bulk, a living thing full of history that we would like to know, life spanning the ages, almost defiant of relentless time and tide. Though in its flattened leaves it resembles the true firs, in its smallish, pendulous cones, the Douglas fir is more like a spruce.

The cones of true firs are large and sit erect on the branchlets. Three real firs are of interest in the West, each claiming a habitat between the alpine slope and sea-

1. To the right, the shaggy-barked trunk and drooping foliage belongs to a yellow cypress (Chamaecyparis nootkatensis). This is a tree mainly of high elevation in the mountains. The small tree bowed under its wintry load closer to the woodsman is a mountain hemlock.

2. Two westerners of high elevation only—5,500 feet here shown in Rainbow Mountains. White-barked pine (left and centre) round-topped and Alpine fir (right) sharp-spired. Both bring a fine touch of beauty to the alpine slopes.

3. The Alpine fir (Abies lasiocarpa), here shown in the Rockies, is the most common tree of the western mountains at from about three to five thousand feet. It is always slender, sharp-spired and picturesque.

4. A trapper's cabin of lodge-pole pines (Pinus murrayana) in a stand of the same. Because of its even straightness it is cabin timber *par excellence*.

Sitka spruces (Picea sitchensis) of the shore-line. These tall warriors, whipped by the storms of three centuries, are not as we usually see this tree. In the heavy woods it is tall, clean-boled straight as a gun-barrel.

Lodge-pines of the Rainbow Mountains, British Columbia. Only when these trees grow singly or scattered in park-like open country do they assume the broad-skirted picturesque type.

level. The Alpine fir (Abies lasiocarpa) is a rather small, very slender, sharp-spired sentinel of the alpine slopes, ridges and meadows. It adds a very picturesque touch to high elevation scenes. The Amabilis fir (Abies amabilis), because of its forest habitat where it is more hidden, is much less striking, and like the western white pine, usually stands as a slender, clean-boled mighty spar on the lower slopes or middle elevation, and usually mixed with other trees. The real grown-up of these 'balsam firs' is the lowland form (Abies grandis) that, on the fat coastal lands at low elevation and in restricted areas, obtains a diameter of three feet or more. It is a fast-growing soft-wooded, easily broken tree, short-lived and generally of little beauty on its feet, and little use when felled. The two latter firs, of course, make excellent pulpwood and the Amabilis is of some importance also in the timber trade. The large up-standing cones of all these firs, dripping with gum like Christmas candles with wax, or perching like little grey owls far aloft, always catch the eye of the visitor.

Like the Douglas fir, the western red cedar (Thuja plicata) is in a class by itself. Except for its too-symmetrical cut, it is beautiful while small, and, in old age with centuries behind it, towers in the forest like a great wooden skyscraper, huge-butted, often hollow, so that it stands on flying buttresses like an old Gothic cathedral. Imposing, soul-stirring, yet scarcely beautiful because, almost invariably, it is dead-topped in old age, it holds its place unchanging, its grey imperishable lance-tip piercing the blue. When it surrenders to the centuries and falls up-rooted upon the forest floor, it lies there as indestructible as time, so that at long length great trees stand astride it — a dozen centuries of forest life on review before the eye of the beholder.

The yellow cedar or cypress (Chamaecyparis nootkatensis) of high elevation — or sea-level on the more northerly

The white spruce (Picea canadensis) of the North-west. It is replaced on the coast by the giant of the family, the Sitka spruce (Picea sitchensis) whose size is its chief recommendation.

The Amabilis fir (Abies amabilis) takes the middle elevation in the mountains, above the lowland fir and below its alpine relative, Abies lasiocarpa.

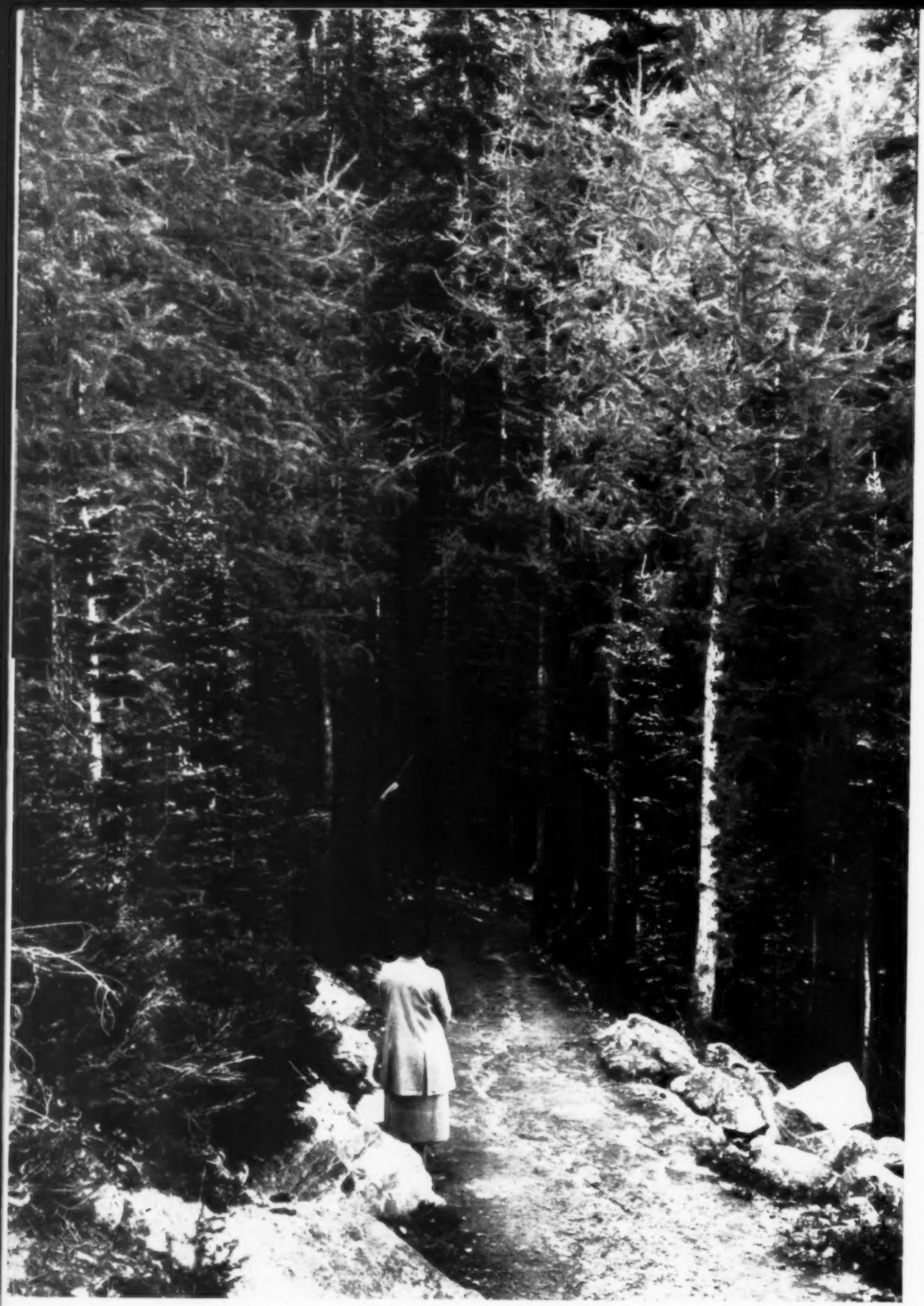
coast — is quite a different tree. Its musky-scented, durable yellowish wood is of interest to the wood worker, but as it stands on the windswept islets or windy points it gives pleasing glimpses of what is so lacking in these western woods of mere timber; a tree with personality, some variety of shape and arrangement in its composition — the type of tree that delights the eye of the artist.

Here and there, always very far scattered, the woods-wanderer comes on an interesting little tree, the western yew (Taxus brevifolia). It is much like a small hemlock and usually escapes the careless eye. From its hard, tough wood are made many of the wondrous bows of the modern Robin Hoods who play at archery.

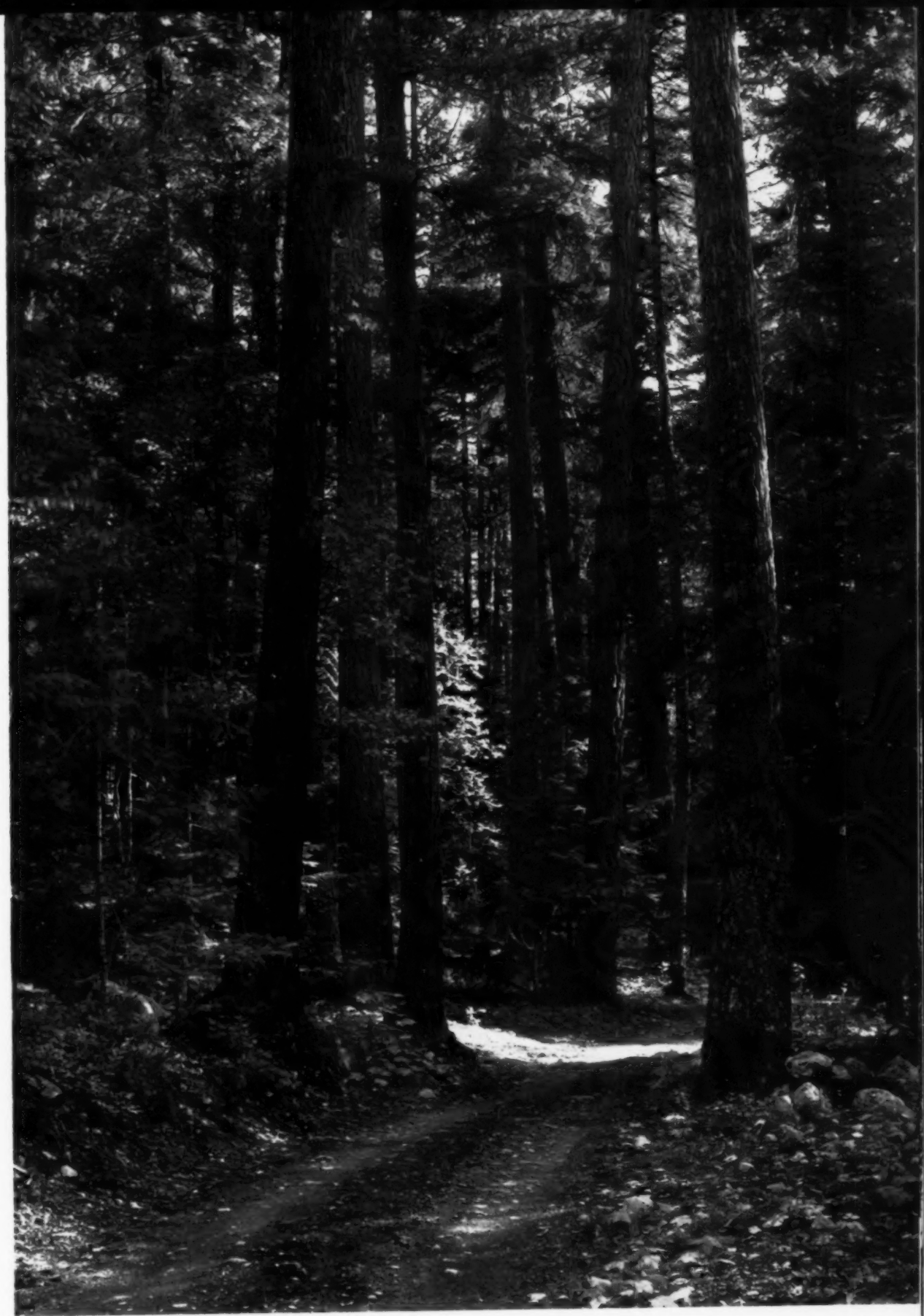
In the matter of willows, the West, because of the wide diversity of terrain, has naturally a splendid variety, but at sea-level it goes in again for size, the humble willow-clump often assuming huge proportions.

It is only in the central and northern interior of British Columbia that we meet the white poplar or quaking aspen (Populus tremuloides) in all the glory of its shivering leaf and smooth-barked primness. Though in places it reaches salt water, it takes not kindly to coastal humidity. But in the rich coastal bottom lands and along the river banks, the black poplar or cottonwood (Populus trichocarpa) assumes the stature of a mighty tree with a diameter of four feet. Borrowing from the conifers, it

Many of the West's most interesting trees are found at timberline where growing scatteredly in a rough world, they become hard-fighting individualists. These are mountain hemlocks (Tsuga mertensiana).



Lyall's larch (Larix lyallii) along a Rocky Mountain trail at Lake Louise, Alberta. Always found at high elevation, when in September its deciduous needles turn to gold, it turns the high slopes to fairyland.



Douglas firs (Pseudotsuga taxifolia) as they stand small and trim in the semi-dry interior. In coastal woods they reach the gigantic proportion that has made the tree world famous.

grows tall and limbless and small-crowned, a far more splendid tree than its close relative, the black poplar (Populus tacamahaca) of the northern interior, that in itself at times is a very respectable forest citizen.

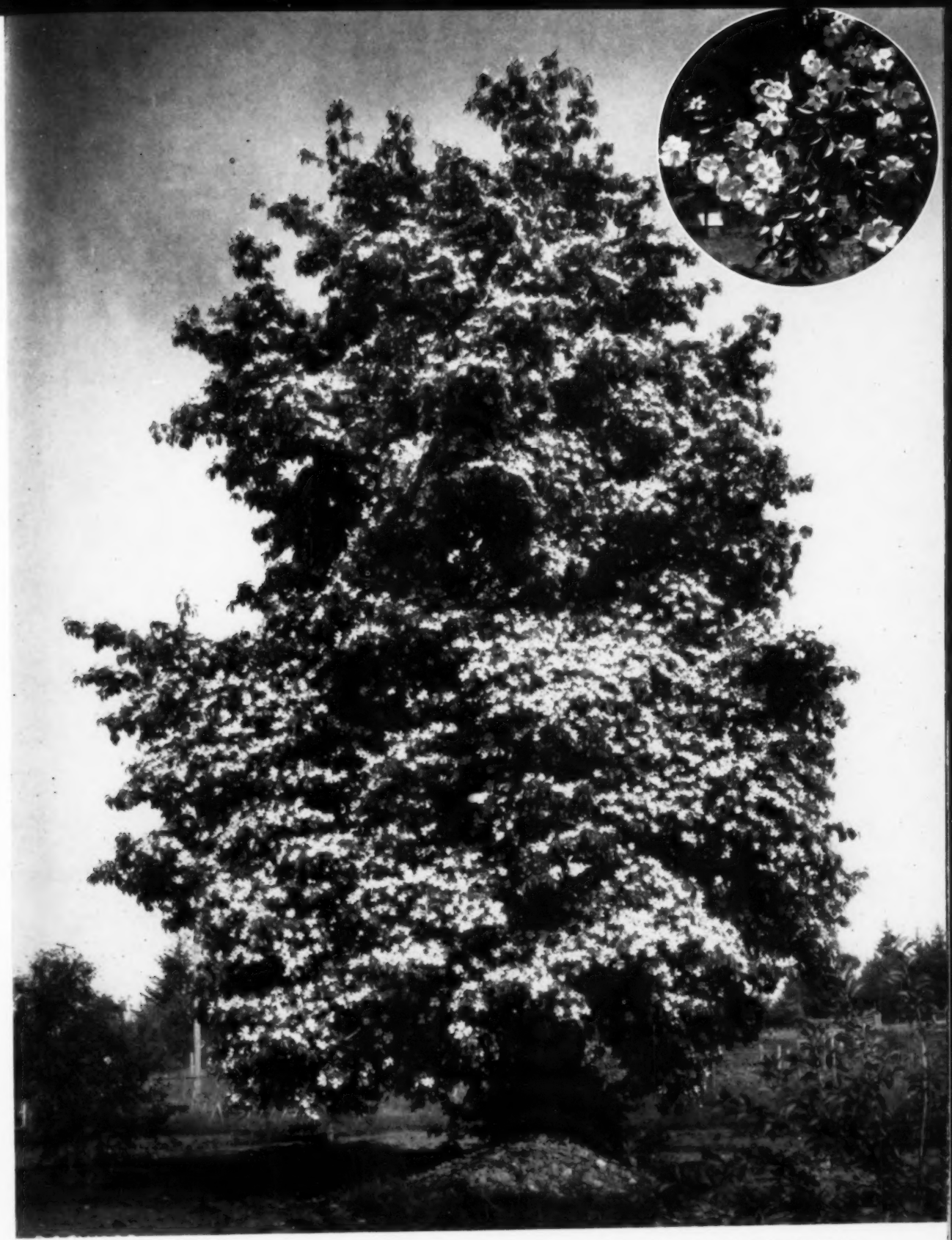
Western counterpart of the picturesque paper or canoe birch of the East, the western birch (Betula occidentalis) is rather disappointing in that though it grows to splendid size, even to three feet diameter, with the pleasing branch-arrangement of this family, its bark too often is dark and dingy and cherry-like. It does not catch the eye and admiration as the better known white birch used to do in the East before axes and saws did their work too well. The canoe or paper birch is also a westerner in that it occurs in northern British Columbia.

The red alder (Alnus oregona), in denying all the traditions of the conifers, offers a very pleasing variety to coastal forests. Though when it must, as when crowded on the rich river flat, it grows straight and limbless, yet it greatly prefers the squat form, large-trunked — even to a diameter of three feet — broad-crowned, wide-limbed, pleasing in its arrangement — a tree rather than timber. Whether in winter's nakedness, red-tassled spring ensemble or tender new leafage, it is a pleasant sight, filling gaps where the towering conifers have gone before the axe of the lumberman. Where moisture is abundant, the red alder is the first tree to reforest every coastal burn and slashing.

When he meets the western oak (Quercus garryana) of Vancouver Island and the lower mainland, the tree lover is almost forced to remove his hat. Here in a land of mere timber is a tree in all that the word can conjure. The Garry oak somewhat resembles the English oak. Is there any connection between the fact that southern Vancouver Island is the home of this oak and the spot most loved and populated by Englishmen in Canada — a "bit of England"? It reaches its main northern limit at Courtenay, Vancouver Island and though assuming splendid stature to this point, quits there abruptly.

In coastal lands the black haw (Crataegus brevispina), though often but a formidable scraggy shrub, again forms a small tree with a trunk diameter of ten or twelve inches. But it is usually a leaning, unsymmetrical creation, too eager to shoot

Typical trees of a Vancouver Island landscape. Towering above the figure is a black poplar or coast cottonwood (Populus trichocarpa). In the fields on the left stand two Garry oaks. Towering the car is a small, second growth Douglas fir. The clump on the right is composed of red alder.



Dogwood in bloom second time in year 1931 near Elk Lake, Victoria, B.C., diameter 24 feet, height 40 feet.
John Dean Photo

Inset:—Dogwood blossoms. The flowering dogwood (Cornus nuttallii) is one of the real tree delights of western woods. It often reaches a foot in diameter, bears abundance of these four-inch flower faces that quite transform the sombre forest.

Top left:—In the madrona (Arbutus menziesii) the coastal West has something distinctive. Sometimes of considerable girth, this smooth, red-barked forest nymph taking a place on the rocky shore or headland, adds a touch to the landscape, that lacking it, would be poor indeed.

Top right:—There is considerable resemblance in western spruces. The Engelmann spruce (Picea engelmannii) shown here in the Rockies is the mountaineer of the family and found only at high elevation. Like other growing conifers its foliage is dense and the needles tough.

Left:—The Garry oak (Quercus garryana) is very restricted in range, confined to a small section of the lower mainland of British Columbia and to the southern half of Vancouver Island. It is a real tree with personality, not mere 'timber'.

Right:—In the matter of willows the West has a splendid variety, but at sea-level it goes in again for size, the humble willow clump assuming huge proportions.

Bottom left:—Lowland fir (Abies grandis) towering a hundred feet above lesser growth of a shoreline forest—note the large broad-leafed maple on the right. When tiny the lowland fir makes the most beautiful of Christmas trees; in later years it has little to recommend it.

Bottom right:—A four-foot black poplar (centre) among western cedars, lower Bella Coola Valley, B.C.

up suckers from its roots and form thickets about its feet. It is of most interest in the spring when it opens its myriad flowers — white mounds of bloom beside the country roadside.

Of the western wild cherries, one, the bird cherry (Prunus emarginata), often may be found in the form of a splendid tree — fifteen inches at the butt, rising tall and well shaped to a height of fifty or sixty feet. Its brown bark has a birch-like appearance; its slender twigs are graceful; in its white bloom it is pleasing. But as 'bird cherry' it is misnamed as its small bright red fruit is so bitter that few birds seem to touch it.

The wild crab-apple (Pyrus diversifolia), in size and habit of growth and in flowering, is so like the black hawthorn that the careless eye might confuse them. This wild apple may obtain a trunk diameter of more than a foot and reach considerable height. But more often, like the thorn, it is arching and "droopy", leaning from stream bank or woods margin, so that in old specimens the weight of the head brings it bowing almost to earth again. It too is not only beautiful in bloom to the human eye but its tough hard wood is very useful to the pioneer, and is a source of rich provender for the birds when in fruit in autumn.

In maples, pride of the East, all Western Canada has been slighted. Its one common form, the broad-leafed maple (Acer macrophyllum), is gross in every way — rank-growing, spreading, huge-leafed, coarse throughout. Though a thing of grandeur when it has hung out its myriads of yellow bloom-tassels in spring, it soon yields only shade, and coastal weather in autumn seldom allows it to don the glad regalia of eastern maples, so pleasing to eastern Canadians. Here again for an honest tree boast, westerners must turn again to mere size. A newspaper clipping tells that in 1929 Seattlites removed one of their pioneer landmarks in the form of a 350-year-old maple that was 110 feet in height and 90 feet across the crown. It was cut down to make room for the

Top left:—The black poplar or cottonwood (Populus balsamifera) is one of the most imposing trees of the small timber area inland. On the coast it is replaced by a much larger relative, Populus trichocarpa, truly a giant, tall, limbless and often five feet on the stump.

Left:—Broad-leafed maple (Acer macrophyllum) in bloom—its most beautiful time, when it hangs out countless large, yellow three-inch flower-tassels. Later when smothered under its huge leafage its beauty is lost. This tree always wins the big maple leaf contest — a leaf on one occasion measuring 284.3 square inches.

hurrying wheels of modern traffic — a new road! The mountain maple (Acer glabrum) is of far less consequence; because of its comparative rarity, it is little known even to westerners; while the small, shrubby vine maple (Acer circinatum), though very delicate and sweet in cut in trunk and leaf and seed-clusters, and though colouring splendidly in autumn, is so restricted in British Columbia as commonly to escape due notice.

A small tree of some interest in this region is the Cascara sagrada, often locally called barberry by "barkers" who in robbing the tree of its smooth grey bark have all but extirpated it. It is a rapid growing, quite symmetrical tree of some beauty of leaf and twig, and though originally it reached a height of sixty or seventy feet with proportionate girth, nowadays the demand for its medicinal bark has all but removed trees of large size from the landscape. Luckily it reproduces itself by seed very early, and so, as a sapling, it is common enough even on its limited range west of the Cascades and on Vancouver Island.

But hats off again to the western dogwood (Cornus nuttallii), not only a picturesque little tree but a flowering tree with abundant masses of great white bloom — four inches across the face — to light up spring woods as a beacon light shines in darkness. Sometimes it blooms both in spring and fall. When a well-grown old dogwood, two feet on the stump, towering aloft under its load of blooms, it is a sight of which westerners have right to be proud. In the United States only the wondrous magnolias of the south-east can show anything as fine.

Another western tree that has no real counterpart in Eastern Canada is the madrona (Arbutus menziesii). This again is no mere spar tree of the forest, but a beautiful tree creation of Nature at her best. Its smooth red bark, its large "rubber-plant" evergreen leaves, its sweet flower-clusters of fairy bells or abundant bright red fruit, its picturesque shapes as it adorns the rocky shore-lines where other trees cannot grow, all make this tree beloved by westerners. Without its dogwoods and madronas truly the coastal West would be a much poorer place.

Top right:—Two arbutus trees, Cape Saxe, Esquimalt, B.C. One in the foreground, height 75′ girth 9′8″, the other, height, 83′ girth, 11′.

John Dean photo

Right:—The red alder (Alnus oregona) is the first coastal tree to reforest the land after slashing or fire. Where it is allowed room to assert its individuality it becomes a pleasing tree of good proportions.

Montréal, 2 janvier 1941.

Monsieur W. L. Fanon,
The Canadian Geographical Journal,
Ottawa, Ontario.

Mon cher monsieur,

J'ai lu avec le plus grand intérêt votre article, "Luxembourg, the City and the Country". Cette lecture fut pour moi un objet de satisfaction et d'étonnement. Comment ne serais-je pas satisfait et étonné à la fois à la constatation qu'en cette terre lointaine du Canada, ma petite patrie, le Grand Duché de Luxembourg, ait trouvé un historien si averti et un panégyriste si enthousiaste que vous. Grâce à vous, les lecteurs du Geographical Magazine du Canada apprendront à mieux connaître et apprécier cet antique Luxembourg, qui témoin vivant de plus de dix siècles d'histoire, demeure debout au coeur de la vieille Europe. Votre récit comme de juste, non seulement place le Luxembourg dans le cadre de l'histoire européenne, mais encore soulève le voile qui recouvre pour le profane certains faits intéressant plus particulièrement l'Amérique en général et le Canada en particulier. Votre article n'est-il pas une révélation pour beaucoup de vos lecteurs, lorsque vous remontez à la communauté d'origine qui, par certains côtés, relie les maisons régnantes du Luxembourg, de l'Angleterre et des Pays-Bas? Qui savait ou se rappelait que la devise du Prince de Galles: "Ich Dien", provient du comte luxembourgeois Jean l'Aveugle qui tomba en 1346 dans la bataille de Crécy en France, où il était accouru pour soutenir son allié, le roi de France, contre les Anglais? Peu de gens savaient par ailleurs que le grand homme d'Etat qui pour la troisième fois revêt la magistrature suprême aux Etats-Unis, le Président Roosevelt, fait remonter par sa mère ses origines lointaines à une ancienne famille noble luxembourgeoise, les de Lannoy (Delano), dont le siège ancestral est le château moyen-âgeux, toujours debout, de Clervaux dans le Grand Duché de Luxembourg. Je ne continue pas pour ne pas diminuer par une anticipation l'intérêt que ne manquera pas de rencontrer la lecture de votre article.

Je termine en exprimant l'espoir que votre étude reçoive auprès du public canadien une audience aussi large et amicale qu'est généreuse l'hospitalité qu'ont trouvée au Canada la Maison Souveraine et le Gouvernement luxembourgeois.

Agréez, cher Monsieur, l'assurance de mes sentiments les meilleurs.

PIERRE DUPONG,
Premier Ministre de Luxembourg.

Montreal, 2nd January, 1941.

Mr. W. L. Fanon,
The Canadian Geographical Journal,
Ottawa, Ontario.

My dear Sir:—

I have read with great interest your article entitled "Luxembourg, the City and the Country".

The perusal was a matter of personal satisfaction and astonishment to me, for how could one have hoped that in this far-away Canada my little homeland, the Grand Duchy of Luxembourg, would find a so well-informed historian who would be such an eulogistic exponent of its many charms at the same time. Thanks to you the readers of the Canadian Geographical Journal will better understand and the more appreciate the old, old Luxembourg that still stands in the very heart of Europe, a witness to ten centuries of its history. Your story does not confine itself to the role acted by Luxembourg throughout these thousand years, but too, you lift the misty veil from a number of facts that are of particular interest to Americans and to Canadians. Should not your article be a revelation to your many readers when you take them back to the far-away origins of the ties that relate the ruling houses of Luxembourg, of England, the Netherlands? Who knew or would have remembered that the Prince of Wales device, "Ich Dien", came from a Count of Luxembourg, John the Blind, who fell at Crécy, where he had hurried to his ally's help? How so few people are aware that the great statesman who for the third time holds the greatest office in the United States, President Roosevelt, is descended on his mother's side from ancient Luxembourg nobility, the de Lannoy family, whose ancestral seat still rears its proud old walls at Clervaux?

I must not continue lest I diminish the interest that your article will no doubt arouse among your readers. Let me conclude by expressing my hope that your review may find among the Canadian public a friendly and sympathetic audience, even as the Sovereign Family of Luxembourg and its Government have been received in Canada with the warmest hospitality.

Accept, dear Sir, the assurance of my friendliest feelings.

PIERRE DUPONG,
Prime Minister of Luxembourg

H. R. H. Grand Duchess Charlotte of Luxembourg and her consort, Prince Felix of Bourbon-Parma

LUXEMBOURG, THE CITY AND THE COUNTRY

by **W. L. FANON**

AUGUST of 1914—another invasion by the Germans had its beginning. While the Grand Duchy's troubles were overshadowed by Belgium's martyrdom, it nevertheless agonized those four years. How much so, but few of us have known, for the world does not know how, in 1913, an Englishman, George Renwick, F.R.G.S., summed up the national feeling in one sentence: "There is no one the Luxembourger hates just quite so much as a Prussian".

Since before Munich, Luxembourgers lived in this fear of "Prussian Protection". Austria and Sudeten had shown what might be in store for them. They had known oppression for eighteen centuries and freedom for less than one. And now Prussianism, this time in the guise of Hitlerism, has struck again.

Let us go back to the dawn of Europe's history, back to fabled Romulus creating an empire on the Tiber, back to Greece's cultural glory, to times when the Celt roamed Western Europe's virgin forests. He left his mark at Didokirch with the Didoselter, for Dido was the granddaughter of Odin, Norse's mightiest god. Smiling Diekirch best shows you its panorama from Thorebierg. On its height the

dolmen stand from out of timeless age, left there by the Celt who swore to Thor, the god of thunder.

The Roman knew Belgica Prima and the Forest of the Arduenna. He fought and feared the giant Trevirian and later counted him among the finest of his cohorts. Lucilinburgum was a Roman camp, halfway between Trèves (Treviris) and Metz (Divodorum). The Escht Hernach of the Celt became the Epternacum of a Roman general's villa. Dalheim has been likened to Pompeii for the riches it kept buried for nearly two milleniums, till one spring day, in 1852, an unsuspecting farmer, who had walked over Roman-made roads all his life, plowed up, in a single hour, three urns with twenty-five thousand coins of gold, silver and bronze. Again at Bous, another farmer tore down his old stone barn and uncovered an exquisite mosaic, wonderfully complete and preserved and more than thirty by fifty feet in size.

The Huns passed here too, six hundred thousand strong, to ravage and pillage the country over its length and breadth. Attila, or Etzel, the Scourge of God, left his name at Ettelbruck and the Hunneley is the Rock of Huns, a short half-mile from the famous Vianden Castle.

Gaul, Goth and Hun had overrun and devastated the land. The Merovingian came next to finish what remained, and to nearly succeed, and the history of the country becomes dim and blurred now, for he left us no token of art nor treasure trove, but folk-lore recalls the horror of his memory. Charlemagne now built his vast realm and banished thousands on thousands of unruly Saxons to Frankish Lucilinburhut. The Wiltzs came with them, to settle in the north, even as they settled throughout England's Wiltshire. Charlemagne's descendant, with the armies of the Bishops of Trèves and Metz, stopped the Norman hordes at Rémich in 882, and only now, out of all this turmoil and bloodshed, emerged Wigeric, the first Count of the Ardennes, whose son, Siegfried, built his stronghold at Lucilinburhut, on the rocky height, where stood the crumbling ruin of a Frankish castle, and became the founder of the Luxembourg line. A last tower, the Hollow Tooth, built over in later centuries, is there to this day, and is reverenced in its age-old defiance. From Siegfried's castle grew the fortress that saw more war than any other in Europe.

For two hundred years or more the country prospered, till it encompassed some six times its thousand square miles of today. Castles appeared on the hills and the hamlets of the serfs to surround them in the valleys. Villages sprang up and became towns, rich and powerful. In 1066, while England fought and lost its battle of Hastings, Conrad was the Count of Luetzelbourg. His descendants ruled for almost four centuries and gave four emperors to the German Empire. Henry IV, Count of Luxembourg, was Henry VII, second German Emperor of his line in 1308. His son, John the Blind, born in Siegfried's castle and the beloved hero of all Luxembourgers, through marriage became King of Bohemia. He went to succour his friend, the King of France, and fell at Crécy in 1346. While the tide of battle turned to the English, the blind King demanded that his horse and his followers be chained together, that they lead him into the thick of the fight so that he might "férir un coup", strike a blow, for his friend's cause. England's Black Prince found the battered corpses on the battle field the next morning. From dead John's helmet he tore the three plumes with the motto "Ich Dien"; they have remained the Prince of Wales' device from that day.

John's son became Charles IV of Germany, and, in 1354, made Luxembourg into a Duchy. His two sons, in turn, succeeded him as emperors, and when the second son, Sigismund, in 1430, gave his daughter to the Emperor of Austria in marriage, he gave her the Duchy as her

The Hollow Tooth, all that remains of Siegfried's castle

The City, from the third outer wall, built in 1346

dowry and Luxembourg passed to the Habsburg crown.

Philip of Burgundy conquered the domain in 1443, only to let it return to Habsburg in 1447, as a wedding gift again, now to share the bloody strife of the Austrian-Spanish-Netherlands War. In 1555 it went to Spain, and Charles V, "on whose empire the sun never set", had as his first title, when he was but nine years old, that of Duke of Luxembourg. It was once more laid waste during the Thirty Years' War, and as its recompense, in 1659, the first of three divisions ceded to France that northern part of Lorraine along the Sarre River, where first we fought the Hun's latest aggression.

In 1684 Louis XIV conquered the whole of the country. He sent Boufflers, the butcher, to raze countless of its mountain fortresses and to generally ravage and murder and destroy, until 1697, when the coalition of England, Holland, Spain and Germany returned the country to the Spanish. They did not keep it long. Twenty-nine years later it belonged to Austria once more, only to be reconquered by the French Revolutionary armies in 1795. Perhaps the most sanguinary persecution in all the thousand years of fighting took place during the five months needed by the Sans-Culottes to subdue this handful of club- and pitchfork-armed farmers. Old Fort Thuengen keeps silent vigil over its ditches, where, almost daily, stolid farmers and staid burghers were shot by the dozen and score, because they would not bow before the goddess of reason. Napoleon's occupation of Luxembourg was welcome after that. The people acclaimed him because he restored their religious freedom to them. Rodemacher, a tiny village, peacefully drowsing within its surrounding twelve-foot walls, gave him Simmer, the son of a lowly tradesman, to become his field marshal and a Baron at the Battle of Wagram.

The Congress of Vienna ended Napoleon's reign in 1815 and supposedly freed Luxembourg of foreign yoke. Metternich, the Austrian statesman, made it into a free Grand Duchy, with membership in the Germanic Confederation, after first slicing off considerable portions, among them the hereditary estates of the Orange-Nassau family, Dillenberg, Dietz and Siegen, which he gave to Prussia. He gave the Grand Duchy to the Netherlands King as his personal appanage, to offset the loss of his Nassau estates, but a Prussian garrison of 20,000 men remained to occupy the federal fortress, which, incidentally, proves that the

Austrian paper-hanger did not invent, but only revived Prussian methods of long ago.

The Belgians had been included in the new Netherlands Kingdom. In 1830 they revolted and Luxembourg promptly joined their fight, all but the city, where lay this Prussian garrison. For this they received a reward similar to that which had come to them for their share in the Thirty Years' War. In 1831, the larger half of the remaining country, peopled by French and Walloons, was given to Belgium to form their new province of Luxembourg. The Treaty of 1839 confirmed this cession and declared Luxembourg a free country, though still with the Netherlands King as a ruler and . . . with the Prussian soldiery to remain.

Napoleon III, who had grown to be quite powerful by 1860, did not like this arrangement. He began negotiations with the Netherlands King for the purchase of the Grand Duchy, but they were averted by Bismarck, in time to stop France and Germany from coming to grips over it. Queen Victoria, who abhorred Bismarck, wrote to King William I of Prussia from Windsor Castle on April 22nd, 1867, that she . . . "felt compelled to write in the interests of peace. . . . The Emperor (Napoleon III) is willing to relinquish all his demands in regard to Luxembourg. . . . he demands only that the garrison should be withdrawn. . . . the request appears a very small thing to concede, in the interests of peace.

"If this request is denied, then the world will appear only too well justified in accusing Prussia of desiring the war and the responsibility for all its misery will be laid at the door of Prussia.

" . . . it rests entirely with Prussia. . . . I beseech you, for God's sake, reflect before casting away this opportunity . . ."

The congress met at London about three weeks after this letter, now in the files of the Brandenburg-Prussian archives at Charlottenburg, had been written by a courageous little lady. Her appeal won. The Prussian garrison was finally ordered to get out. The fortress was dismantled, and the country at last became neutral, and, in truth, free and independent.

* * *

Let us go back once more, back to the end of the thirteenth century. Here we find a certain Valéran, Lord of Ligny and Roussy, a younger son of Henry II, Count of Luxembourg. His great great grandson, also a Valéran, became a Constable of France in 1412. England, during the Hundred Years' War, carried him off a prisoner and he married Matilda, the daughter of Thomas Holland, Earl of Kent, half-sister to King Richard II. His nephew, Peter of Brienne, inherited his titles and domains as the next male heir. Peter's son, Louis, returned to the service of France, only to lose his head for treason. His daughter married a Prince of Bourbon-Vendôme, and her son founded the Luxembourg-Brienne family, tracing himself back to the ancestral Henry II. Eventually, after the extinction of the senior branch, Madeleine-Charlotte, Duchess of Luxembourg-Pinhey, Princess of Tinguy, of the junior line, became the wife of Henri, Duke of Montmorency-Bouteville, who adopted the title of Duke of Luxembourg-Montmorency. He was the son of Henri, Duke of Montmorency, Viceroy of New France, after whom our own Montmorency Falls are named.

* * *

Away up north in the Grand Duchy, fairly hidden among the sombre, rugged hills of the Ardennes, there is a picturesque valley. The Romans called it Clara Vallis, and the town's name has remained Clairvaux through the untold years. Built on a hill, rising out of this delightful dell, stands its castle, a jumble of towers and pointed turrets over enormous walls, somehow grimly determined to retain its ancient splendid strength. But the grey, forbidding walls harbour a first-class hotel whose hospitality belies black oaken doors that close no longer on deep, dank dungeons. The origin of the castle goes back to the tenth century and when, during the fourteenth century the Clairvaux family became extinct, the succession fell to the Flanders Seigneurs de Lannoy. Of that family the best known was Charles, who probably saw the light of day in this very castle in 1470. He was made Vice King of Naples by Emperor Charles V. As an Imperial general he defeated Francis I, King of France, at Pavia in 1525, and took him as his prisoner to Madrid. One of his descendants, Philippe de Lannoy, landed at Plymouth in 1621 to settle in Massachusetts and to become one of the ancestors of the gracious lady of Hyde Park, New York, Mrs. Sara

The Three Towers of 1050 A.D.

Clervaux Castle and way-side shrine

Delano (de Lannoy) Roosevelt, mother of the thrice President of the United States.

* * *

A few short miles to the east of Clairvaux stands the Castle of Vianden. The ruins belong to the Ducal family now and have been carefully preserved for the last fifty years or so. And well they might. As early as the ninth century the castle had been built on the site of the old Roman camp of Viennense. Richard the Lion-heart went on his crusade, accompanied by a Count of Vianden with his troops. The seat of mighty lords was this Vianden Castle that grew to be a veritable stronghold. Its banquet hall, now open to the sky, could seat five hundred men at arms. Four floors can be counted in the still standing, two-yard thick walls. High up on its second floor, over an open hearth, is the sculptured coat of arms of the House of Nassau, three roses and two small figures, each holding a glass. By the marriage of Countess Adelaïde of Vianden to Otto, Count of Nassau-Dillenberg, the two houses had become united and from the dynasty of Orange-Nassau-Vianden descends, in direct line, the present Royal family of Holland.

The last Prince of Orange, Philibert, had died childless in 1530. His sister's son, René of Nassau-Châlons, whose father had been Henri, Duke of Nassau-Vianden, succeeded Philibert. René also died without issue and his cousin on his father's side, William, Count of Nassau-Dillenberg, succeeded him. He was William the Silent, Prince of Vianden and Duke of Nassau, founder of the Dutch Republic. His successor, while still Prince of Orange, married the daughter of James, Duke of York, who became James II, and in 1689, the Prince of Orange ousted his father-in-law from the throne, to become England's King William III.

* * *

In 1890, William III of Holland died without a male heir. He was, since the Treaty of 1815, the third Netherlands king to be Grand Duke of Luxembourg. The Salic Law of Charlemagne's time and a Nassau family pact which excluded female succession made it impossible for his daughter, Holland's Queen Wilhelmina, to inherit the Luxembourg succession. Going back to 1255, we find the Nassau family dividing their lands between two brothers, Walram and Otto. Walram, the elder, had retained Nassau proper. Otto took the western lands and became the founder of the Holland branch. The

Grand Ducal palace

Luxembourg crown now came to the nearest male heir of the two families, Adolphe, of the Nassau-Weilburg family, who had been Duke of Nassau until 1866. He became a Prince without a country, because he had sided with Austria in her war against Prussia, and so lost his domain, though not his head, as well he might in olden times or in ultra-modern Hitler days. In 1891, Adolphe became the first exclusive ruler of the Grand Duchy. He died in 1906, to be succeeded by his son Guillaume, whose daughter, Marie-Adelaïde, inherited the throne at his death in 1912, a special law dispensing with the Salic law of male succession having been passed by the Chamber of Deputies.

The holocaust of 1914 now broke, and the helpless little country was overrun by the German juggernaut from the very beginning of the war. For the Luxembourgers, who had for fifty years now sung their national song:

"Ask you all folks where'er you go,
Prussians we shall never be,"

four long, hateful years of enslavement began.

The Treaty of London in 1867 had confirmed the one of 1839, and guaranteed Luxembourg's neutrality in perpetuity, with Prussia as one of the six high contracting parties. The Franco-Prussian War

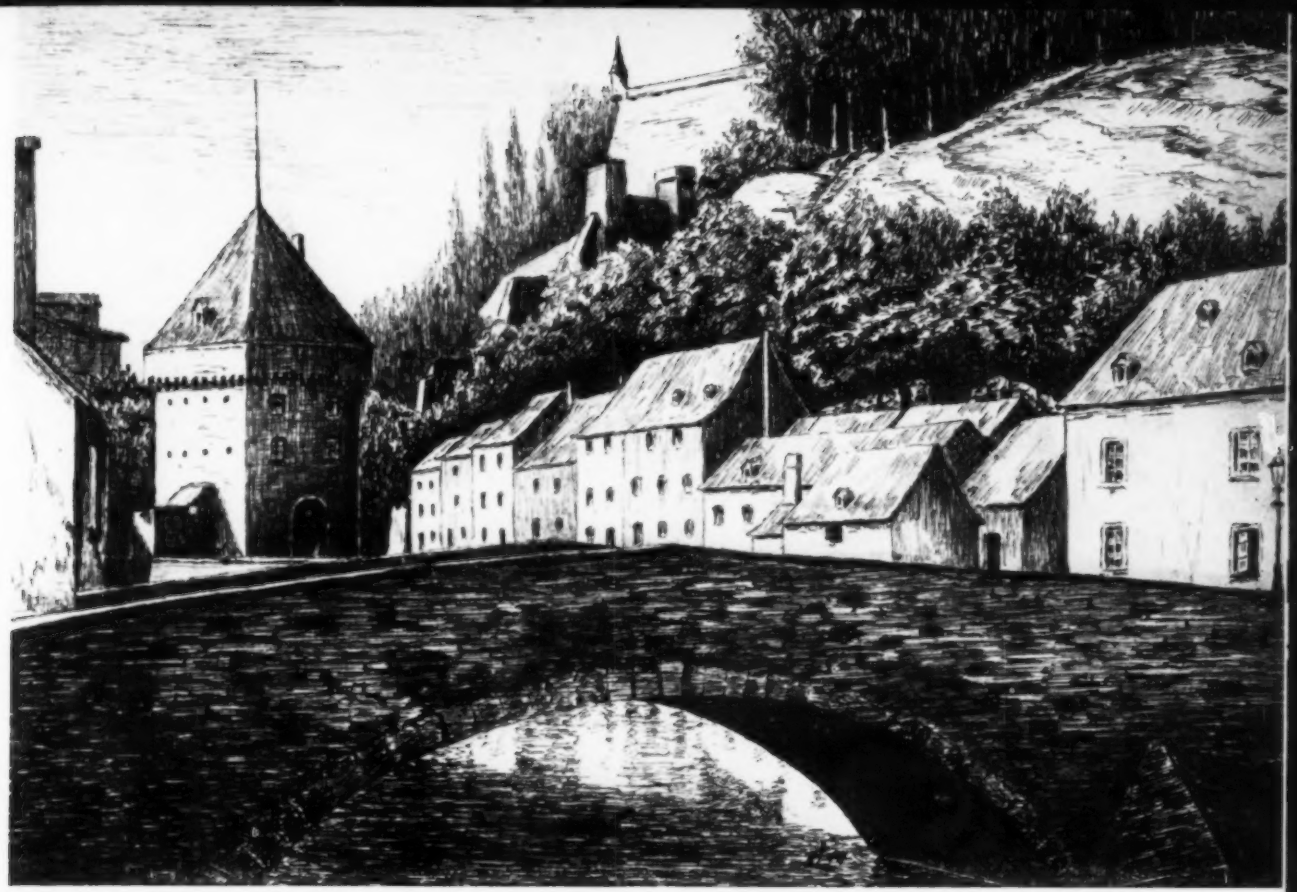
of 1870 culminated in the recreation of the German Empire. A great deal of argumentation has been put forth from time to time that the German Empire as such had not been a signatory to the 1867 treaty. However, in 1842, on the insistence of its Dutch King, Luxembourg had entered the German Zollverein, the customs union. As a corollary thereof, in 1872, the German Empire forced a new treaty on Luxembourg whereby the Imperial Alsace-Lorraine railway was given the running rights over the Guillaume-Luxembourg road. This new treaty stipulated that the German Government did not have the right to use the Luxembourg railway for any war purposes whatever, nor in a manner "incompatible with the neutrality of the Grand Duchy". The agreement was for thirty years and was renewed in 1902, with the neutrality stipulation clearly reiterated. Therefore, the German Empire, on two occasions recognized the treaty obligations entered into by Prussia, which would seem to clearly establish their violation of the country's neutrality.

On July 31, 1914, the President of Luxembourg's National Assembly asked the German Ambassador, von Bach, for a declaration that the country's neutrality would be observed. The answer was: "That follows of itself . . ." but continued, that France would have to give a like guarantee. The French official assurance was received on August 1st, and during that night German troops invaded the Grand Duchy. The following day the German Minister of Foreign Affairs wired the Luxembourg Government that "regrettably, military measures had been taken because certain information had been received to indicate that French troops were on the march against Luxembourg . . . that in the imminence of that danger no previous discussions had been possible". Two days later, the President, M. Paul Eyschen, told the National Assembly that no French troops had been seen by any one on Luxembourg territory.

On that day also, August 4th, von Bethmann-Hollweg addressed the Reichstag. He stated that German troops had entered Luxembourg, "in contradiction of the rules of International Law," and disposed of the treaties, the one concerning Belgium and that with Luxembourg, as being only a "Scrap of Paper".

Hitler calls that sort of thing the taking under German protection of weaker peoples. He also said, last May, that France and Great Britain were about to send troops through Holland or Belgium or Luxembourg. Be it Hitler or Beth-

Alzette River, where Siegfried and Melusina trysted, and century old houses closely cling together.



Bridge of the "Blessed Sick Folk". Tower and walls erected by Vauban.

mann-Hollweg, German methods have not changed.

Marie-Adelaïde was Luxembourg's Grand Duchess in August, 1914. The 1867 Treaty of London had disarmed the little country most thoroughly. Resistance was out of all question, and only the gesture of a formal protest could be made by the Princess, after which she confined herself within her palace, a voluntary prisoner. In September, 1914, the Kaiser established his personal headquarters at Luxembourg because of its strategic location. His father had dispossessed Adolphe of Nassau. He now strutted over Adelaïde's realm and promptly inflicted his visit on the unfortunate girl. Powerless to object and fearful of possible consequences to the people whose fate depended so wholly on the whims of a man whom Bismarck had described as "vain, meddlesome and oversexed", Adelaïde received him in her home, a really great sacrifice when one knows and understands the anti-Prussian feelings inborn in the Nassau family. None the less, the Grand Duchess' action was misunderstood. A story about her pro-German inclination, fostered and disseminated by an important Luxembourg faction who opposed Adelaïde's internal policy, was spread among the allied countries and the Princess, entirely cut off from all communication with others, could not correct the impression. When the Armistice brought freedom back to Luxembourg, Adelaïde abdicated in favour of her sister and retired to a convent, where a few years later she died, the personal, broken-hearted victim of the Kaiser's arrogance. The succession of Grand Duchess Charlotte was confirmed by referendum that autumn, and an overwhelming majority left no doubt as to the popular wish.

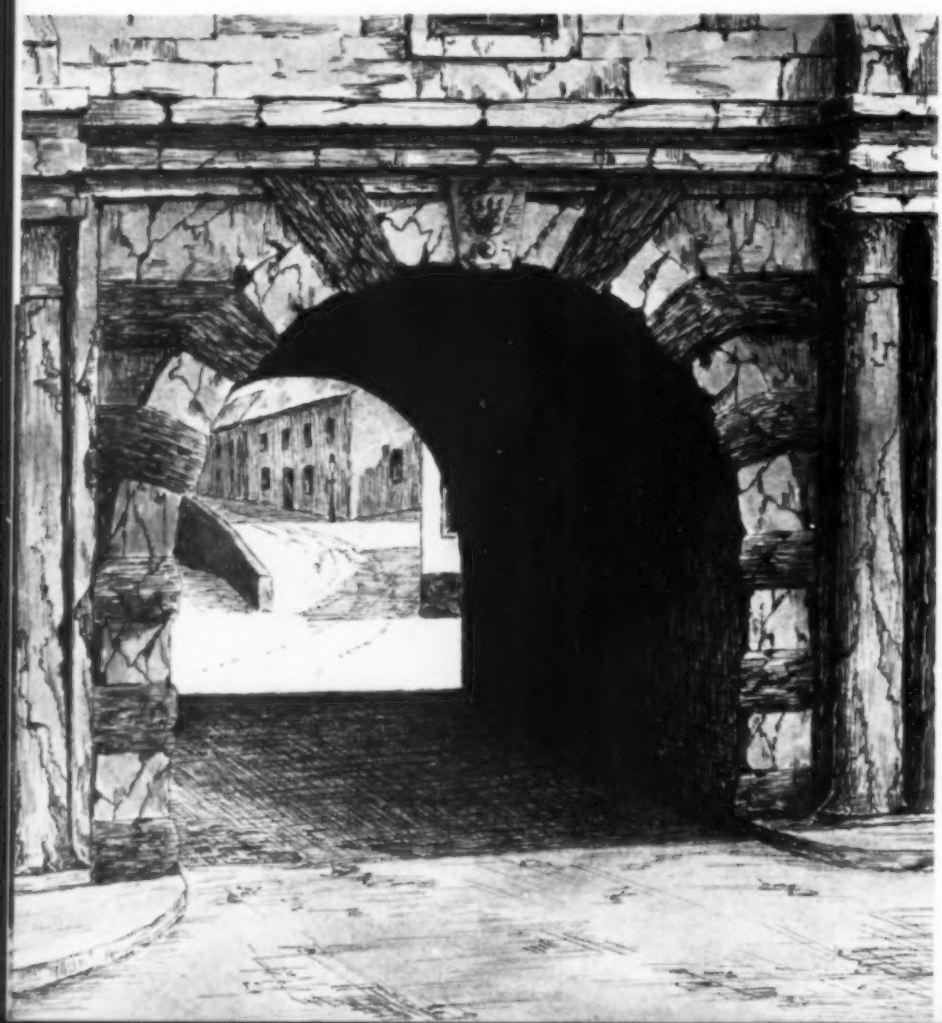
Grand Duke Adolphe, by circumstance, had become the country's ruler. His granddaughter Charlotte was chosen by popular vote. On November 6th, 1919, she married Félix, Prince of Bourbon-Parma, a descendant of Louis XIV's grandson Philippe of Bourbon, Duke of Anjou and King of Spain. By act of Parliament, two days before the wedding, the Prince became a naturalized Luxembourger. The people had at last chosen their dynasty. They were well content.

* * *

The country's economic situation, following the Great War, was very difficult. The referendum had clearly shown that the Luxembourger wished to remain free and neutral. Still, dissociated from the Zollverein, a new customs union, be it with France or with Belgium, became unavoidable for the small country. The industrial interests gave their preference to Belgium, because Luxembourg has iron ore but no coal, and Belgium has coal and only little ore. The important wine commerce also objected to a union with France because that offered them no market for their product. The agrarian class, perhaps the most powerful, wished for French union, but gave in eventually, and so, what was considered a congenial association, one that would advance moral as well as material development, came into being, and Belgium replaced Germany in the country's customs union. The railroads of the two countries, while remaining under separate ownership, were handled by a single administration. Belgian consuls began to look after Luxembourg interests wherever that country had no representation of its own. Belgian money, except for currency and bills of less than one hundred francs, became the official means of exchange. A loan of 175 million francs was granted by Belgium, and Luxembourg once more began to build and prosper.

Universal suffrage is the law and votes for women have existed since 1919. They have a Chamber of Deputies with some fifty members. Five Ministers, with their President selected by the Grand Duchess to become Minister of State, form the grand Ducal Cabinet. Five Chambers, representing traders and industrialists, agriculturists, artisans, private employees and workmen, who elect their own members within their occupations, are consulted before any laws affecting their interests are passed by the Chamber of Deputies. And that, so it seems, is real democracy.

Forty odd blast furnaces are spread over the Black Region. Luxembourg capital controls "Arbed", the metallic organ-



Gate of Mansfeld Castle and Park, last vestige of the most powerful European family in the fifteenth and sixteenth centuries

ization that produces some eight million tons of ore within the country and owns or controls like industries in Belgium, France, South Africa and Brazil. Of 8,000 workers, by far the largest majority are of Italian birth or extraction. Their settlements of 20,000 souls spread over a score or more towns throughout the mining district. They were not a racial problem to the Government, but Hitler's friend Mussolini somehow managed to reduce their number very considerably in the last few years.

Wines, gloves, leather, dairy produce and cattle, china and cement, roses and orchids, draperies and tobacco are export products.

* * *

Yes, the Luxembourgers were happy in their valleys and glens. Yes, they lived contentedly among their ruined mountain fortresses, peaceably contemplating their relics, eerie with tradition. Yes, they wished to keep, and keep on loving, their museums of architecture, their mementoes of olden ways and manners.

The fortress of Luxembourg had been built to be impregnable. The genius of France's Vauban is immortalized in its gigantic walls. Austrian and Spaniard and yes, Prussian too, added to its strength. On three sides cliffs and walls rear their height for two hundred feet. Bastions and towers and massive walls to the west had made it the Gibraltar of the North. Subterranean rooms and halls and passages, twenty-three kilometers long in all, honeycomb the huge rock. Cathedral-like vaults are connected by mile-long galleries. Wells are there, hollowed through the hundred feet, down to the river's level. Stairways, winding down and down, hewn from the eternal rock by what incredible labour, cross under the river to bring relays from the heart of the fortress to its outermost bastion. The entire town's population could withdraw to this haven of underground safety.

The world's ignorance about Luxembourg is understandable when we think of its smallness. What do we know of Andorra or Lichtenstein? Yet do not, for that, confound it with the Palace of Luxembourg at Paris, though a Prince of Luxembourg-Pinhey built that. Do not think of it as the Belgian Province, lost to the Duchy just a hundred years ago. Think not, speak not of it as some German land. No, do not do that, we beg of you. For three thousand Luxembourgers are remembered by the Flèche du Souvenir. They fought and many gave their lives in the Great War, wearing France's uniform of the Foreign Legion.

Think of Luxembourg as a free and independent country, a veritable democracy. Consider its economic and social status, a model for mightier lands to copy. Since 1927, the Budget has been balanced every year. The Luxembourgers do not like borrowing, so they live within their means and State revenue exceeds expenditure every year. From the turn of the century, compulsory workman's insurance and compensation have been in operation. In 1931, a bill providing for Old Age and Invalidity Pensions for salaried employees, by obligatory contributions from employer and employee, became law.

The country's constitution guarantees religious liberty, and although ninety-seven per cent of the population is Catholic, the Protestant and Jewish minorities have State-paid ministers or rabbis. Income taxes are low, of course, since the revenue does not have to be fed to a hungry military machine, but goes to improve roads, to build

schools and hospitals instead. Freedom of the press, of assembly, of the right to associate, seem such obvious necessities to the Luxembourger that the thought of possible interference or of censorship appears ridiculous to him.

Travel over its railway system, owned within the country now, with the greatest per capita mileage in the world. Roam through the Ardennes Mountains in their beautiful, pristine wilderness. Visit the ruins of the countless châteaux where they sleep atop their crags and share their dreams of valorous deed and romantic past. Come to Wiltz and hear a dialect that you will clearly understand ever so often, yet not be able to reply.

Follow the splendid roads, fruit-tree lined for mile after mile, through the rich, intensively cultivated Good Lands. See the mile-long fields of rose bushes that intoxicate the heavens with their fragrance. Drive past the prospering farms of pocket handkerchief size to our hundred acres. Stay and visit awhile where the people sun of an evening, afore their pear-tree and grape-vine festooned homes. Climb the tower of Notre-Dame Cathedral on a clear winter afternoon and see the southern skies burst into a Dantéesque inferno, while forty mills spew forth their molten wealth.

Roam through a land where illiteracy and unemployment are unknown. Live with the Luxembourgers while they dance and sing and are gay, and have good food to eat and love good wine to drink. Live with them in their memories of the past. Hear their saga of Siegfried and Melusina and wonder if Lohengrin's legend may have had its beginning on the Alzette River, not perhaps on the Rhine. Hear them tell of John the Blind, who lost his sight on Moravian marshes, gave his life to help a friend and sleeps on alien soil. Let them recount to you of Jean Beck, a goat-herder's son, who campaigned with Tilly and Wallenstein and became his country's Governor. Follow them each year on their faithful pilgrimage at Clervaux, to the unforgotten graves of their heroes of the Revolution massacres.

Take one of the easy-going, small-gage railroads, "Charlie" the one and "Johnnie" the other, and voyage through picturesque "Little Switzerland", where once the ocean rolled and Titans tore gigantic cliffs asunder, till you come to Echternach, and stand and be awed by the tenacity that has preserved, for these past thousand years, the ritual of its Jumping Procession to St. Willibrord's grave, the Englishman who brought Christianity to Sûre and Moselle shores. Come to the Schubermess and puzzle over its Celtic name and how this fair has been going on since 1340, though the occasion it commemorates has long since been forgotten. Enter their Athenaeum, where learning and knowledge have been dispensed for eight centuries. Come and worship at the Dominican church that had its origin before the year one thousand.

In January of 1939, the Grand Duchy celebrated its centenary of independence. Twenty years of peace had passed by and the upsetting days of January 1919 were all forgotten. With pomp and with historic pageantry the Luxembourgers celebrated one hundred years of freedom, twenty years of their Grand Duchess' reign and the coming of age of the first Luxembourg-born male heir, young Prince John, who was now eighteen. The people fêted, and their joyous songs rose from north and south, from east to west. With happy hearts they shouted: "Vive le Luxembourg, Vive la Grande Duchesse, Vive le Prince".

* * *

Two years have passed since then. The ogre's rapacious jaws clamped shut on the little land last May. England harbours Holland's Queen. Canada has become the host of Luxembourg's Grand Duchess, of her family and of the country's Government. Confident of the justice of their cause and of England's championship, they await the day when Britain shall again have won the last battle of her war, when the latest beast of Berlin shall be no more, when small, helpless peoples may once again look into the light of the sun.

Yes, one has to live with the Luxembourger to learn wherefrom he begets his love of country, which to-day makes him, so small and insignificant a part in the bloody maelstrom of Teutonic aggression, to suffer and pain under Hitler's heel, yet hope and still sing his national prayer:

"Oh Thou on high, Whose guiding hand
The world and nations leads,
Protect the Luxembourger land
From foreign yoke and grief.
From childhood on, Thou gavest us
The love of liberty.
Keep shining our freedom's sun
That we so long have owned".

EDITOR'S NOTE-BOOK

Arthur L. Neal, writer of "Development of Radio Communication in Canada", is a native of Nova Scotia. He was educated at Acadia University and at the London School of Economics, London University, England. Director of Economic Research, Department of Trade and Commerce, Ottawa, Mr. Neal was recently honoured by being made a constituent member of the Inter-American Statistical Institute, of whom there are eight in Canada and sixty-two throughout the world.

Hamilton M. Laing moved west from his native Ontario at an early age and grew up in Manitoba. The writer has travelled widely, visiting Japan, by the Aleutian route, in studying bird life for the National Museum of Canada. He has also conducted ornithological expeditions to Alaska. Of late years his home has been on Vancouver Island, at Comox. Noted chiefly for his writings and photography of wild life subjects, particularly birds and mammals, Mr. Laing has been a lover of trees since his early pioneer experience in Ontario's hardwood bush, and his article "Trees of Our Western Forests" presents the fruits of many years' observations.

EDITORIAL

Yesterday, Prime Minister Churchill's ringing challenge that Britons share in achieving Victory and winning Freedom must be Blood, Sweat and Tears, electrified the world. To-day, to the standard bearers in Britain, this figure of speech is reality. The united acceptance of their leader's challenge has won "doffed hats" from every liberty-loving nation in the world, now crystallizing daily in the winning of new Allies to the Cause of Freedom. While the great majority of Canadians may not be called upon to contribute to the Cause in terms of Churchill's symbol, we may unite and "Sweat" to provide cash that will send ships, planes, armament and food, that the Blood and Tears may not be shed in vain.

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The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is three dollars in Canada.

The Society has no political or other sectional associations, and is responsible only to its members. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as funds of the Society may permit.

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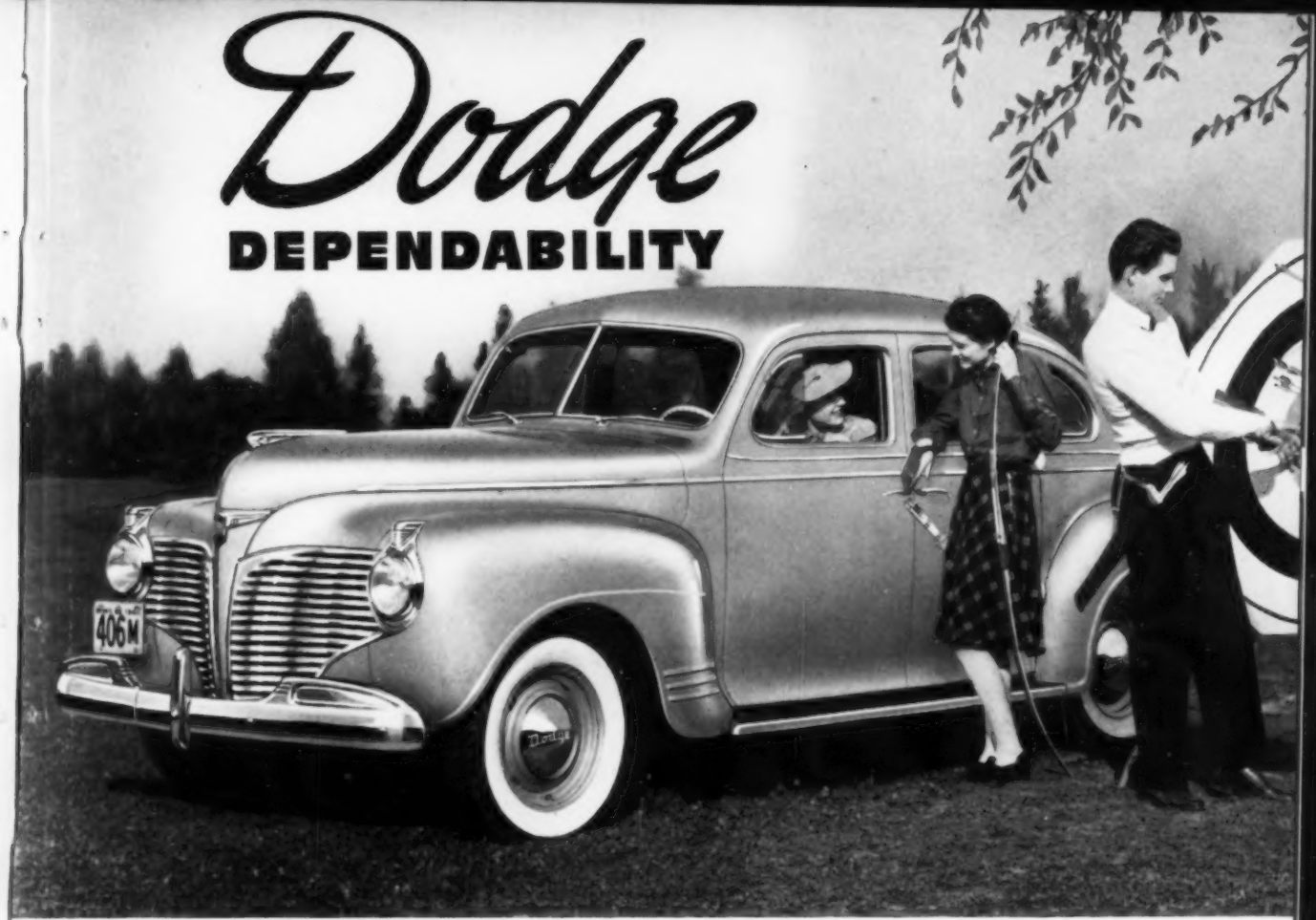

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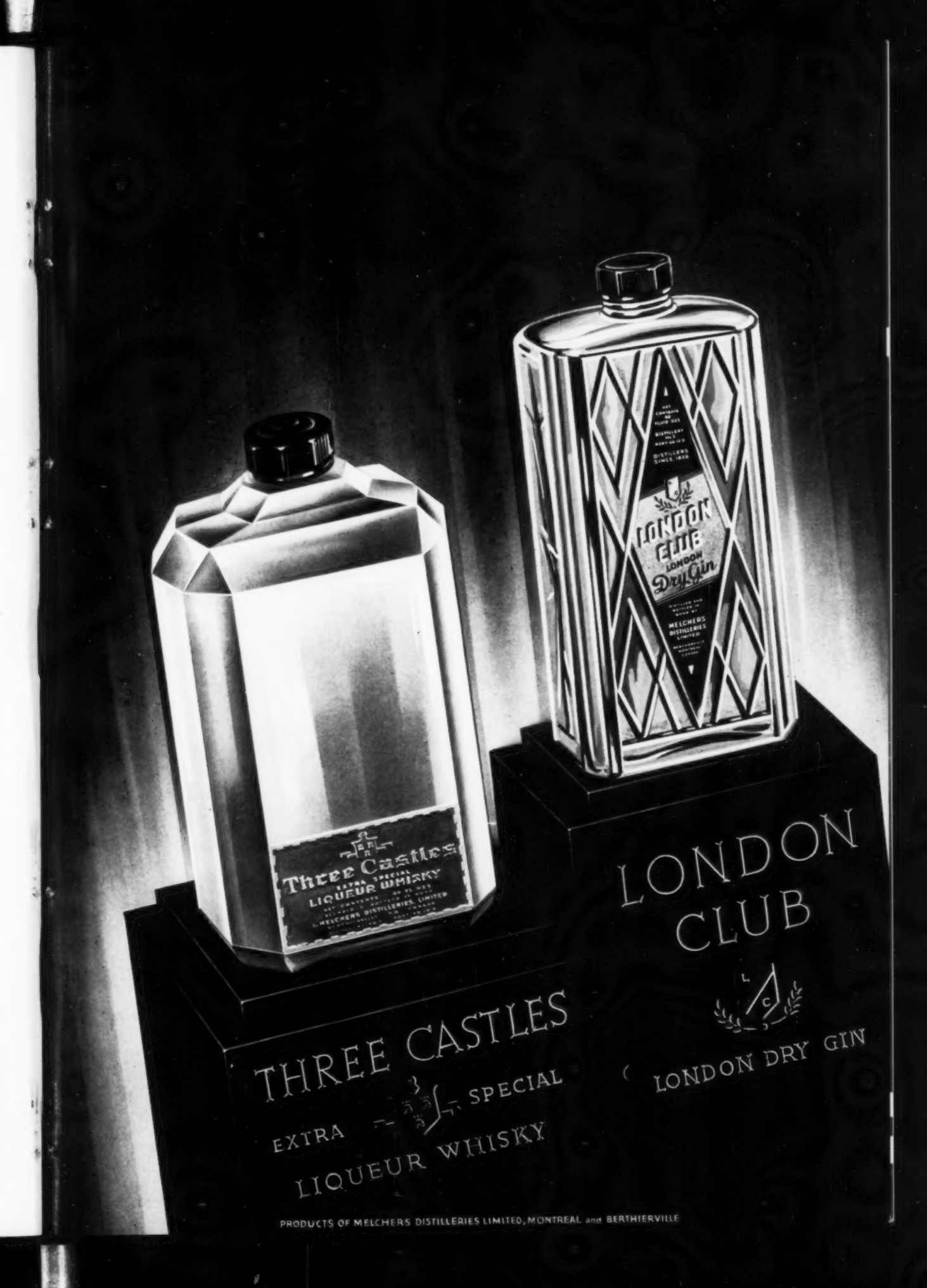
AMONGST THE NEW BOOKS

Corn Country, by C. HENRY WARREN (London: Batsford, 1940, 10/6 net). In England corn means such cereals as oats, rye, barley and wheat, but chiefly wheat, and, in this richly informative book, Mr. Warren gives an account of English corn-growing from its earliest beginning in the New Stone Age, down to the present, when the war has brought home to the British people's startled realization its importance and the serious consequences of its neglect. From the author's own experiences and observations, from his association with farmers and their labourers, from his knowledge of the history and traditions of English farming processes, and his study of those masters of husbandry, Coke of Norfolk, Cobbett, Lord Ernle, A. G. Street and Lord Lymington, he has written a glorious book.

The prologue strikes the keynote with its first sentence, "The best way to get to Mr. Smith's water mill in summer is through the cornfields and along the river . . . A peculiar peacefulness pervades such inland water mills. They are as indigenous to the English scene as its churches, its barns, and its thatched cottages." The mill had been in the same family for generations, and its owner recalled the days when all the villagers used to bring him their gleanings to be milled, and then took their flour home to bake in their own brick ovens. Reluctantly he had installed machinery, but his heart and mind were equally insistent on the better bread and better life that went with the old wholesome ways.

As the farmer's year begins with autumn sowing, "October for wheat-sowing calleth as fast", says Tusser, so Mr. Warren begins Part 2 of his book with the husbandman's autumn work, the fiddling, broadcast sowing, dibbling and drilling. It should be said that the practices described by Mr. Warren are chiefly those of East Anglia and thereby the picture gains in sharpness and raciness from its characteristic dialect and traditions. The chapter on *Winter* brings a fascinating account of straw-plaiting and threshing. The author discovered in an Essex village an old woman who still could plait the numerous patterns and proudly instructed him in the processes undergone by the straw before her skilful fingers transformed it into "Single Sevens, Double Notch, Three Waves, Brilliant" and many other intricate designs.

Spring brings us a very alluring chapter, in spite of its rather homely sub-title, "Milling and baking". Here Mr. Warren enlarges on his theme of the prologue with a wealth of detailed information on the old water and windmills, the millstones, with "the intricate pattern of chisellings by which they accomplished their task", the laborious "dressing" they needed when the grooves had worn away, and many other fascinating bits of milling and baking lore. The housewives in old East Anglian days baked their loaves as do Quebec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habitants in their bakeovens. "Give me for a beautiful sight", says Cobbett, "a neat and smart woman heating her oven and setting her bread" and he declares "a woman who does not know how to bake bread is unworthy of trust and confidence and indeed a mere burden on the community". A bit severe was Cobbett. But the bread of those days was stone ground and had much greater food value. One of the men recalling his early days said, "But there was stayin'-power in the bread then same as there was in the beer — not like to-day, when most everything you put inside you is all harmed up with them there chemicals". Mr. Warren comments, "Homely words from homely minds, but for all that not very far from the truth".

Summer covers another lovely chapter devoted to Harvest, Harvest home, Cleaning and Thatching. The third part of the book is devoted to a most timely and thoughtful discussion of what lies ahead in the agricultural life of England. "A saner attitude to the land is one of the basic improvements that must come out of this war — an attitude involving a better life for farmer and farmhand alike — an attitude based upon a recognition of the fact that the health of the whole people rests ultimately upon the health of the land."

The illustrations are from paintings by John Constable and Ford Madox Brown reproduced in colour, from happily chosen photographs, prints, engravings and drawings. There is also a bibliography and an adequate index.

Chiltern Country, by H. J. MASSINGHAM (London: Batsford, Autumn 1940, 8/6 net). Among the glorified guide books brought out by the Batsfords, two by Mr. Massingham have already been noted in these columns, his *Cotswold Country* and *English Downland*. Even more intimately known to the author, who lives on its outskirts, is the Chiltern country, the Chalk Uplands running through Buckinghamshire, Hertfordshire and Oxfordshire. In spite of its nearness to London, it remains largely a remote and secluded district, marked by wide-spreading beechwoods, small primitive hamlets and the practice of the indigenous craft of chair-turning. In this comprehensive and sympathetic study, Mr. Massingham ranges all over the hill chain and its various ramifications, describes its scenic character and charm, its hill-structure and lovely views, its villages and hamlets. He also touches on Chiltern history and antiquities, farming and crafts such as the remarkable "bodgering" or work in primitive sheds in the woods themselves, and the lace making and straw plaiting for which Tring was famous. Mr. Massingham feels bitterly the infiltration of suburbanism and its unrealities, and has some scathing things to say of shoddy architecture, Puritan vandalism and misguided restoration, but the book as a whole is a delight to the eye and the mind. The illustrations are from very beautiful photographs, and drawings by Thomas Hennell.

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